PLD Series Power Amplifier Application Guide

for Portable PA

www.qsc.com

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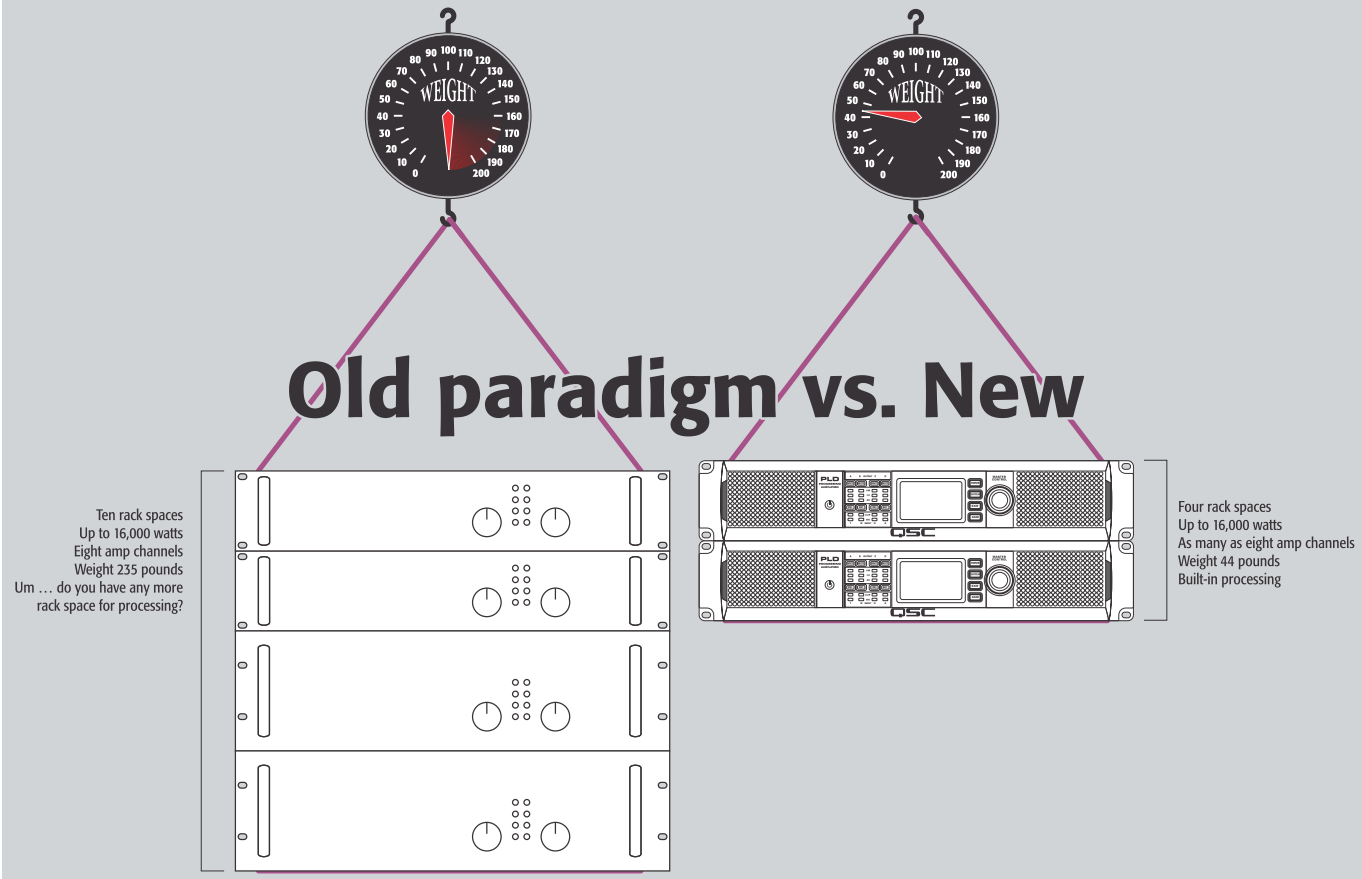
1. Introduction

Why PLD?

The role of a power amp is simple: the proverbial function is a virtual straight wire with gain. Take the input signal and make it bigger to push a loudspeaker. Given this, you certainly might be forgiven for thinking that big amplifier innovation ended some years ago. And to be honest, power amps in recent years have increasingly met levels of performance and reliability that were impossible some 20 or 30 years ago.

The PLD Series amplifiers from QSC take it all a few steps further while adding such versatile features as digital signal processing, Flexible Amplifier Summing Technology™ (FAST), and particularly high power and channel density.

The three models in the PLD range are the PLD4.2, the PLD4.3, and the PLD4.5. All are four-channel amplifiers, though those four channels can be configured and combined in different ways to make one, two, three, or four channels, all in a two-rack-space package.



PLD: A new paradigm

The innovative technology built into the PLD amplifiers represents a very new paradigm of audio amplification, one without many of the restrictions and burdens that we've had to bear in the past.

Channel density, power density

Among professional power amps, the most common size is 2RU, and the vast majority also have two audio channels. That means that if you happen to need, say, eight channels of amplification, you'll need at least 8 rack spaces in your equipment racks—maybe even more, if they are very high-power 3 RU or 4 RU models.

But imagine, with PLD you could now have those same eight channels of amplification—with up to 2000 watts each—in only four rack spaces, with a total weight of only 44 pounds.

User interface

The front panel of a PLD amp features a 400 × 240 pixel color screen that, along with the master control knob and both mute and select buttons for each channel, serves as the user interface (UI).

The UI handles all amplifier configuration and is completely menu driven. Unlike past QSC amplifier models, there are no configuration switches on the rear panel.

Built-in processing

An ample amount of digital signal processing (DSP) is built into the PLD Series amplifiers. The DSP serves a dual purpose: first is to manage the operation of the amp—by controlling the functions of the power supply, the protection systems, the fan speed, signal routing and mixing—and the second is to execute the necessary loudspeaker and system processing that used to require one or more external devices.

The processing functions available include:

- Five bands of parametric EQ per channel.
- High- and/or low-pass filtering, with choice of frequency, slope, and filter type. High and low shelving are also available.
- Limiting, with selectable threshold and ratio, as well as selectable power limiting.
- Delay, up to 50 ms on each channel

Weight savings

Some of us remember when even a 1,000-watt amp wasn't something you could just grab and lift with one arm.

Now, thanks to advanced switch-mode power supplies, which operate at high frequencies and therefore can convert thousands of watts in small, lightweight power transformers, and highly-efficient class D amplification technology, which can turn those thousands of watts into audio power with a minimal number of semiconductor devices and relatively small heat sinks, we can have four-channel amplifiers rated at 2,000 watts per channel that weigh only 22 pounds.

The potential savings in labor, freight, and wear and tear are enormous, especially for weekend warriors and regular gigging.

Physical layout

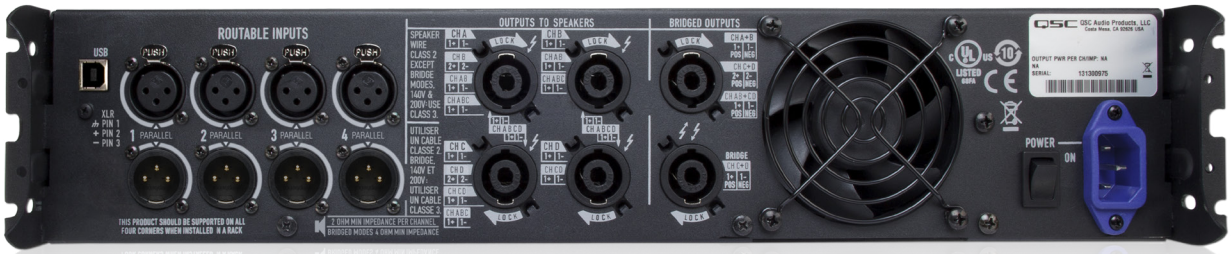
The PLD Series feature a neat, organized layout of the rear panel connectors and master power switch. The four XLR inputs feature male loop-through connectors to allow easy daisy-chaining of input signals. There are six NL4 Speakon connectors, including two that are exclusively used for bridged mono operation, that offer connections for all possible individual, parallel, or bridged arrangements of amp channels.

For diagnostic, configuration, management, and other functionality, a USB Type B connector provides access to the amplifier's DSP through the free downloadable Amplifier Navigator application (available on the QSC web site).

For a roadworthy and secure power connection, a locking (when used with a corresponding power cable) IEC connector helps make sure the system turns on every time you flip the switch.

The fan draws cooling air from the back of the amplifier chassis and pushes it through the internal heat sinks, to be exhausted out the front panel perforations. Directing the air flow in this manner helps prevent a buildup of heated air within the equipment rack.

The rack ears at the rear corners provide support in racks equipped with rear rails. To avoid stress and damage to the chassis, we recommend attaching the rear rack ears to the equipment rack, especially in portable and mobile applications.



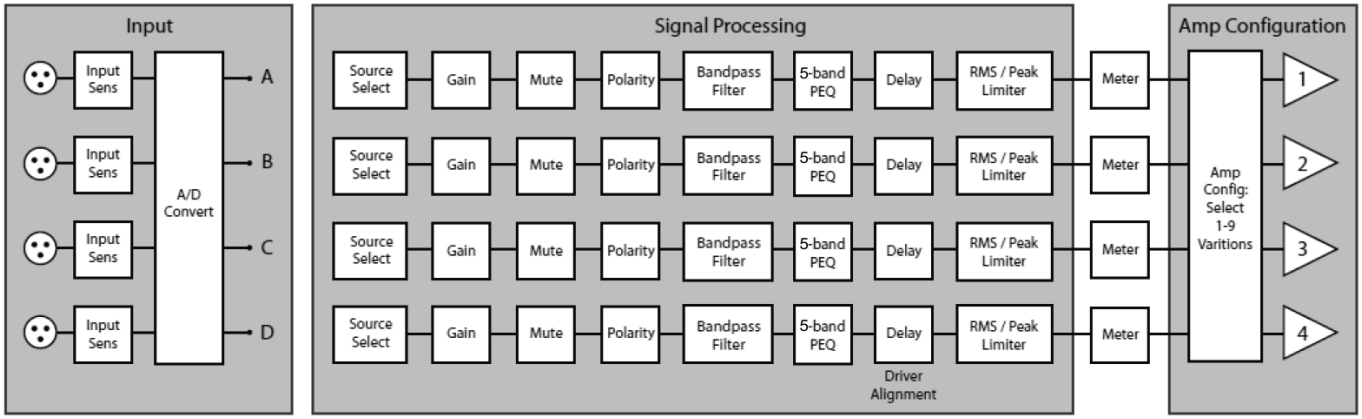
Block diagram

From input to output, the PLD Series power amps are unique. The electronically balanced inputs feed an analog input circuit with selectable sensitivity (at maximum gain)—either +4 dBu (1.23 V) or +14 dBu (3.88 V)—or selectable maximum voltage gain: 26 dB (20×), 29 dB (28×), 32 dB (40×), or 35 dB (56×). These settings also help scale the input signal more optimally to the analog-to-digital converter (ADC). The +4 dBu setting is more suitable for levels from consumer or semi-pro audio equipment, and the +14 dBu is more suitable for professional-level signals. The gain settings, on the other hand, are well suited for making design calculations in multi-amp systems.

An interesting aspect of a PLD Series power amp is the versatile configurability between its inputs and its output power sections. Although the amp has four inputs and four outputs, they do not necessarily correspond one-to-one (although they can be configured that way). Instead, a 4×4 matrix router ("Source Select" in the block diagram following this section) allows the user to assign one or more inputs to the various output power sections. This is all done in the digital domain, in the amp's DSP circuitry.

From there, each output channel has a full assortment of processing features available for EQ, filtering (including crossover), dynamics (RMS and peak limiting), polarity, and delay (up to 50 ms on each channel).

Selectable via the menu are Intrinsic Correction™ processing profiles for select QSC loudspeaker systems, which allow optimized voicing. Profiles for a number of other popular loudspeaker models are also selectable.



Electrical power

Electrical power has always been a potential constraint on portable production audio systems, whether they're run from a building's AC mains or from portable power—i.e., a generator. Power amplifiers are by far the biggest consumers of electrical power in an audio system, and through the PLD Series's significant advances in power factor, efficiency, and universal voltage capability, the constraints presented by available power just aren't as limiting any more. With PLD, your system can produce more audio power for a given amount of available AC, in more places and in more applications, than before possible.

Power factor

Electrical usage has become a growing concern in recent years. AC-powered devices have a characteristic called *power factor* that describes the relationship of the current waveform to the voltage waveform. If the current waveform through a device coincides exactly and proportionally with the voltage waveform applied across it, its power factor is 1. Examples of devices with perfect power factor are space heaters and incandescent light bulbs (without dimmers), which present a purely resistive load to the AC mains. The total power used and/or dissipated by an AC device, in watts, is equal to rms voltage times rms current times power factor. Therefore, power factor tells us how much of the current provided by the mains actually gets used as power (this includes wasted power due to inefficiencies in the device).

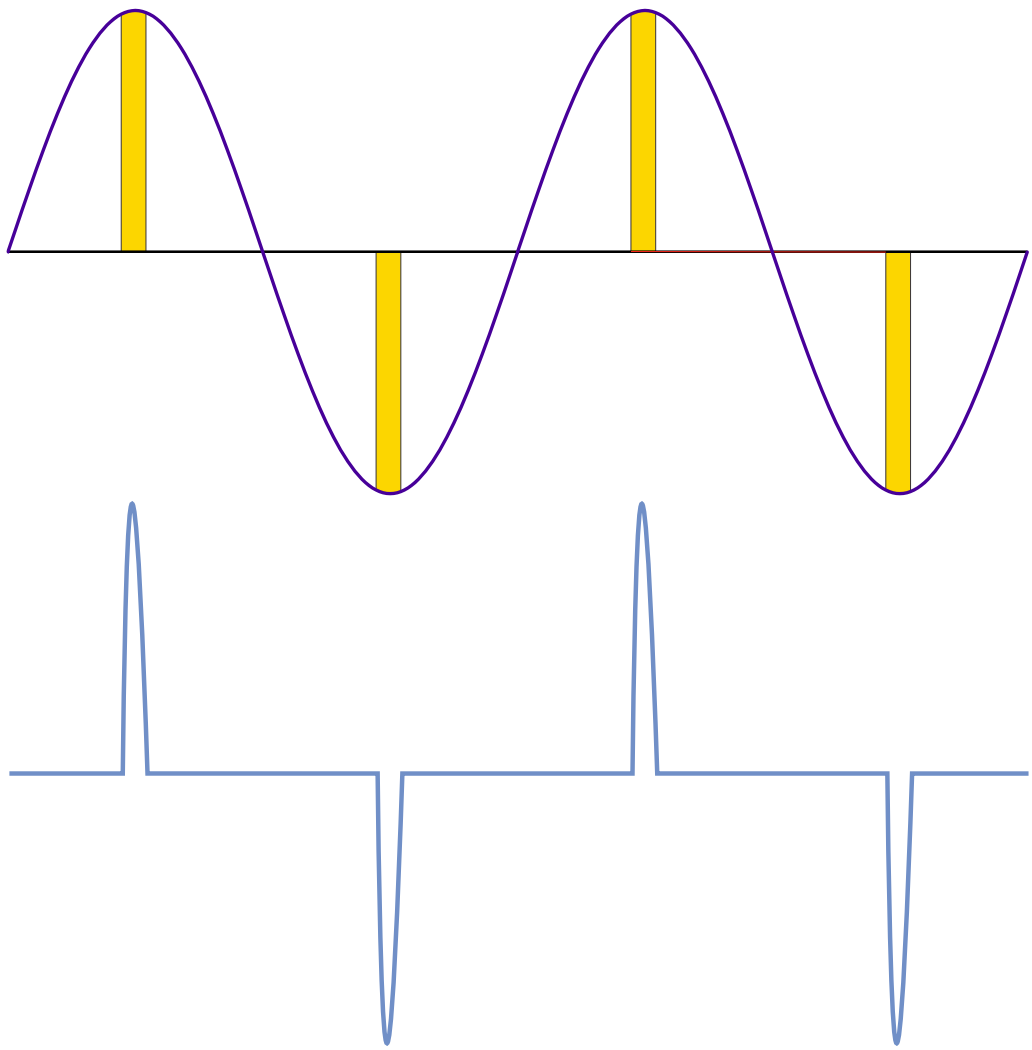
In devices where the current waveform is still sinusoidal but shifted out of phase with the voltage, as often happens with AC motors under various load conditions, or is not sinusoidal, as with most electronic power supplies, the power factor is somewhat less than 1. That means the AC mains actually have to deliver more current than what actually gets used as power. This may require building substantial excess current capacity into an AC system with no real return on that investment.

Unfortunately, electronic power supplies—even the heavy line-frequency (non switch-mode) ones that are colloquially called "linear"—are actually highly nonlinear. As the use of electronic devices increases and resistive appliances such as incandescent lighting decreases, this nonlinearity presents a growing challenge to the AC mains power generation and distribution systems and may even require them to be oversized. This is because of "peak rectification," where the alternating current (AC) is converted into direct current (DC) and fed into reservoir capacitors to smooth out the voltage. The diodes—semiconductor "check valves" that allow current to flow in one direction but not the other—that do the rectifying do not actually conduct current until the instantaneous voltage of the AC is slightly higher than the DC voltage stored in the capacitor.

The result is that the current flows only at the peaks of the AC voltage waveform, leading to a current waveform that isn't a sine wave like the voltage; instead it comprises sharp spikes alternating positive and negative every half cycle. Needless to say, the power factor can be a figure much less than 1 (typically around 0.65).

Because the current needs of the device are compressed into a very narrow conduction angle, the peak values of the current can be excessively high. High current peaks cause two types of problem in the AC system itself: power loss ($I^2 \times R$) in the wiring, which becomes heat in the wires, outlets, etc.; and distortion because of nonlinear voltage drop ($I \times R$), which squashes the tips of the voltage waveform. The high harmonic content of the current peaks sometimes causes noise radiation issues.

Concern about the pervasive effects of nonlinear power supplies has even led governmental and international agencies to establish limits and standards on power factor in electronic products, especially those that draw large amounts of current.



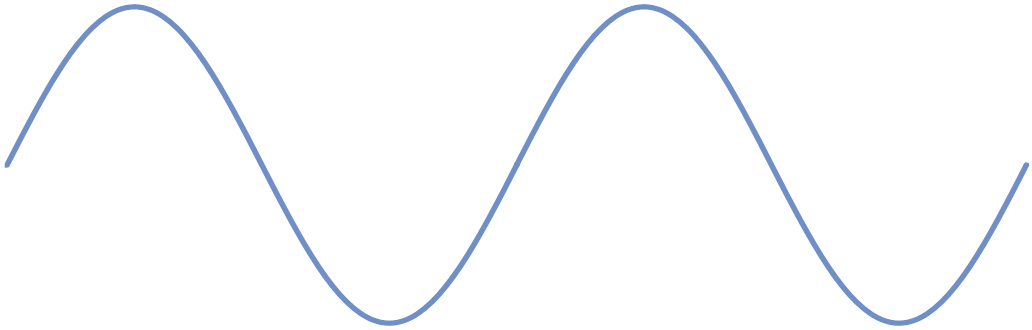
The narrow conduction time in the rectifiers of a non-PFC power supply, above, results in sharp current peaks, below.

Power factor correction

An advantage of switch-mode power supply technology used in the PLD4.3 and PLD4.5 amplifiers is that we design power factor correction into them; the current flows throughout the whole voltage waveform and not only at the peaks. Conventional, non-switch-mode power supplies cannot do this in a practical way.

Power factor correction, as employed in the power supply of these two models, makes the current waveform more nearly sinusoidal to closely match the AC voltage and achieve power factor figures of at least 0.9 (and even upwards of 0.95 under heavy duty). This practically eliminates any significant harmonic currents and voltage waveform distortion, and reduces current peaks as well.

In its class of professional power amplifiers, only the PLD Series from QSC offers power factor correction in any models.



When the current waveform is a sine that coincides exactly with the voltage waveform, the load on the AC mains appears linear and resistive.

Efficiency

PLD Series power amps are kind to the AC mains in another important way: electrical efficiency, or the ratio of output power to the power drawn from the AC mains. The dynamic nature of audio and its frequency range spanning some ten octaves has always made it very difficult to achive very good efficiency in power amps. Any power that comes in on the power cable that doesn't go out through the loudspeaker cables is wasted and turns into heat. Low efficiency not only limits how large an audio system you can use with a given level of electrical service, but also results in greater size, weight, and cost, largely because of the increased needs for output devices, heat sinks, fan, etc. Power amp designers developed and refined Class AB, Class G, and Class H technologies to help improve electical efficiency.

But Class D—a radically different method of amplification—has truly revolutionized the quest for efficiency. Instead of using the audio signal to modulate a voltage across output transistors, which is inherently lossy, Class D converts the varying amplitude of the signal into a pulse-width-modulated stream, where the time duration of the pulses are proportional to the value of the signal. The pulse stream switches the output transistors fully on and off, so they dissipate very little power even at high output levels. A passive network of inductors and capacitors smooths out the pulses to reconstruct the audio signal.

The PLD4.3 and PLD4.5 amplifers use a custom proprietary dual output transistor device on each channel, which comprises a precisely matched pair of MOSFET dies. These are tightly integrated into the design of the amplifier's modulator and yield exceptionally good audio performance and extremely high efficiency. This also is why we can fit four high-power amp channels into a lightweight two-rack-space package!

Truly universal voltage

Historically, QSC power amps have been manufactured to operate on a specific mains voltage: 100 volts (Japan), 120 volts (primarily North America and some parts of South America), and 230 volts (Europe, Africa, most of Asia, and parts of South America). This was not much of a problem if all of your production activities were within a region served by the same voltage, but in many cases users who worked internationally or even in countries where multiple mains voltages are in common usage found it a hassle to use heavy-duty step-up or step-down transformers.

The PLD Series amplifers use power supplies with truly universal voltage ability. Unlike some "universal" power supplies that work in a given range above and below 120 volts and another given range above and below 230 volts but behave erratically at voltages in between, the PLD power supplies adapt fully and seamlessly to any AC mains voltage from 90 to 260 volts.

FAST (Flexible Amplifier Summing Technology™)

Four, three, two, or one channel

The four channels of a PLD amp can be run separately, but they also can be combined in novel ways.

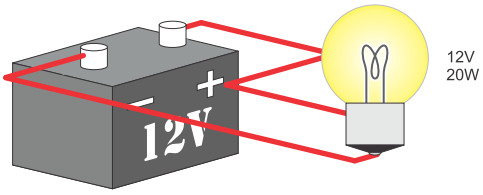
You're probably familiar with bridging, which couples two amp channels in series to produce up to double the output voltage of a single channel. PLD amp channels can be bridged, but unlike nearly every power amp on the market, they can also be connected in parallel to beef up the output current capacity. This is most useful for loudspeaker systems with low impedances, such as two or even one ohm. Thus, a PLD amp can be tailored in many different ways to suit the particular needs of driving a wide range of loudspeakers.

You just can't do this with any other amp. You can't do this without QSC's FAST, which keeps paralleled amp channels matched and synchronized precisely so they do not blow each other up when they're connected together.

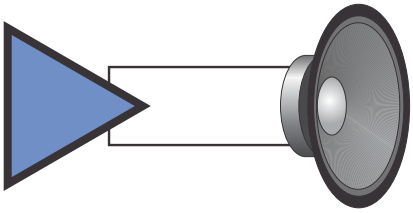
A power amp is a voltage source, as is a battery. The difference is that while the battery puts out a constant DC voltage, the power amp puts out a varying voltage in the form of an audio signal. But FAST allows you to use techniques that you might be familiar with in using batteries to multiply the versatility of the amplifier.

Single

For example, a battery has a given output voltage and a certain capacity to deliver current into a load. Similarly, an amplifier channel has a given output voltage capacity (the actual voltage varies with the signal) and current capacity.

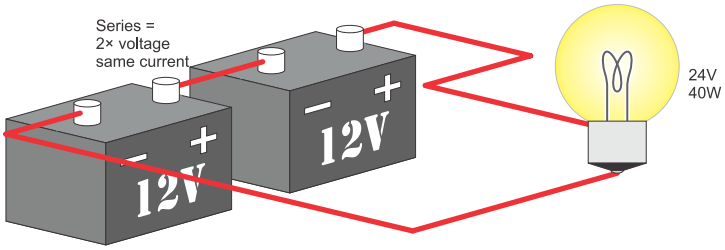


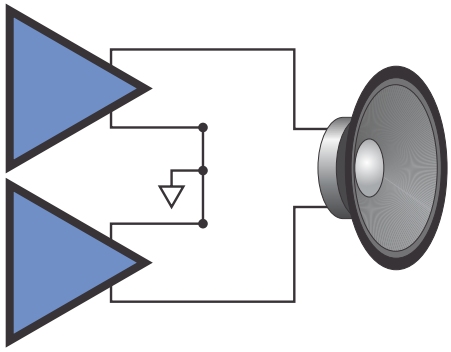
A voltage source, whether it's a battery or an amplifier, has certain voltage and current capabilities.



Series (bridged mono)

To get twice as much voltage, add an identical second battery or amp channel. The current capacity remains the same, however, so this is useful for higher-power loads that have a relatively high resistance or impedance.

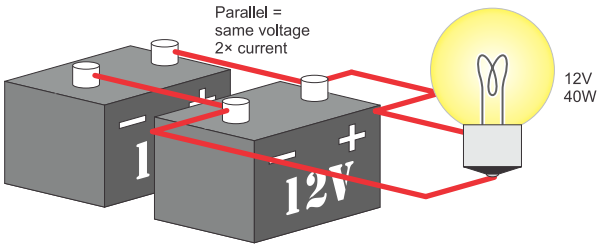


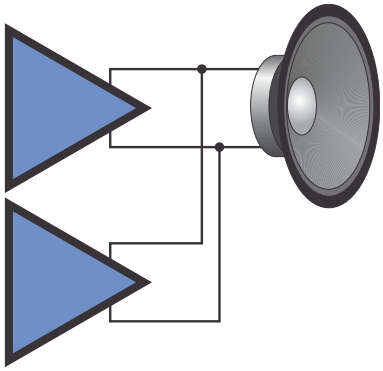


Having two identical voltage sources in series provides double the voltage capability but does not increase current.
In PLD amplifiers, bridged mono is suitable for higher load impedances—that is, 4Ω or higher.

Parallel

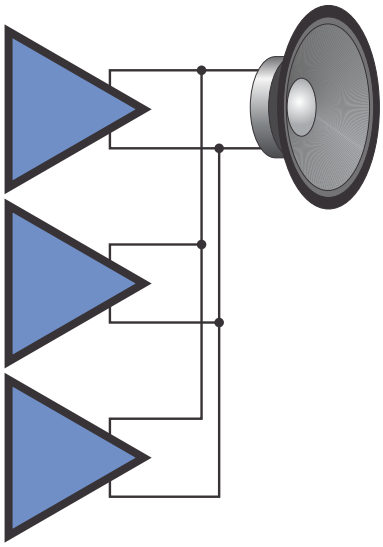
Doubling up in parallel, instead of series, doubles the current capacity but keeps the voltage the same as with a single battery or amp channel. This is useful for higher-power but low-resistance or low-impedance loads.



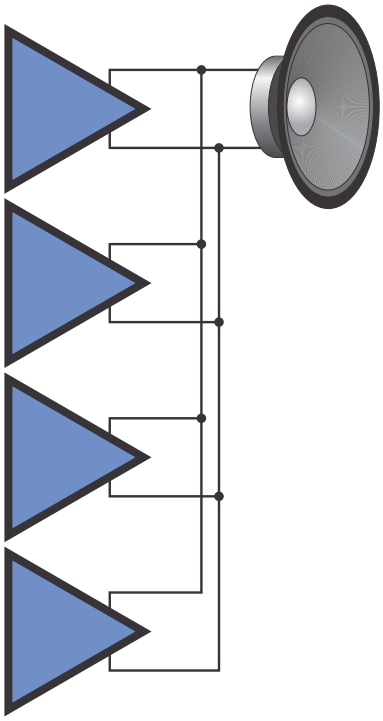


Two identical voltage sources in parallel, however, double the available current.
In PLD amplifiers, parallel is suitable for load impedances of 2 to 4Ω.

Connecting additional parallel identical batteries or amp channels increases the capacity for delivering current proportionally, up to the limits of what the power supply can provide. Even all four channels of a PLD amp can be put in parallel, where they can drive a load impedance as low as 1Ω!

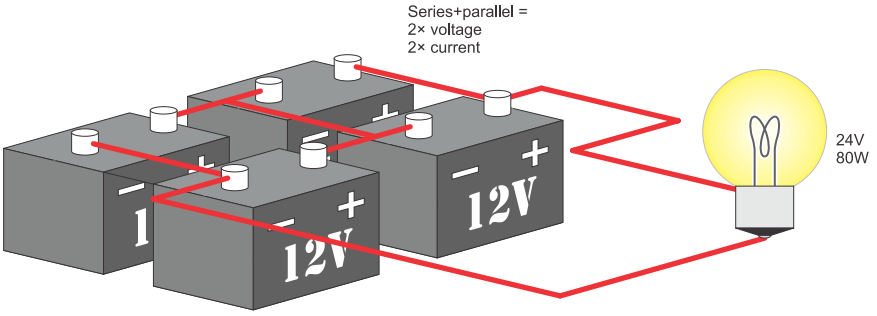


Paralleling three or four amp channels triples or quadruples the available current, respectively, but does not increase available voltage.
In PLD amplifiers, this technique can be used for driving extremely low load impedances of 1 to 2Ω.

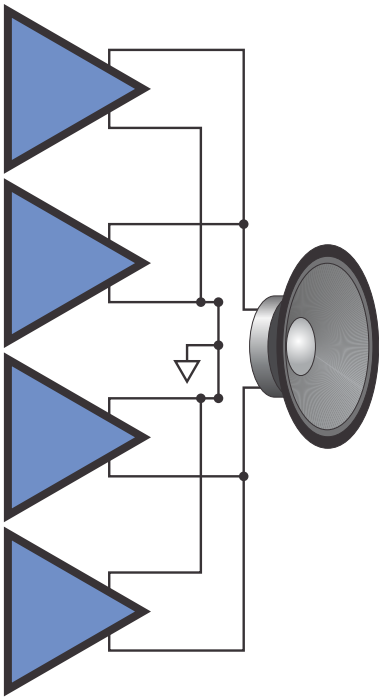


Series-parallel

Four batteries—or four PLD amp channels—can be arranged in a combination of both parallel and series. This doubles the voltage and the current, potentially quadrupling the available power to the load.

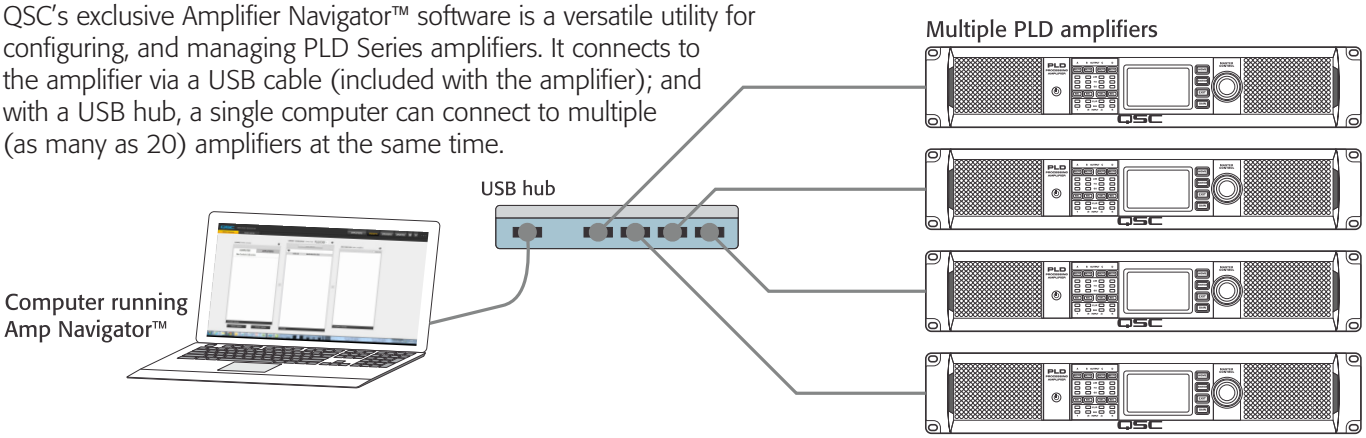


Arranging four voltage sources in a combined series-parallel arrangement doubles both available voltage and current.
In PLD amplifiers, this is suitable for harnessing the power of all four channels to drive high-power loads of 4 to 8Ω.



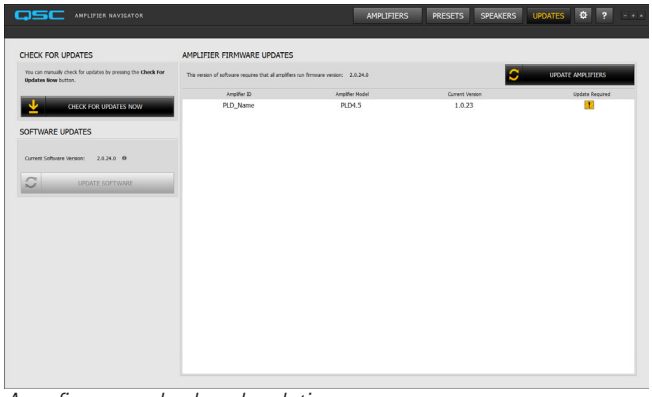
Amplifier Navigator™

QSC's exclusive Amplifier Navigator™ software is a versatile utility for configuring, and managing PLD Series amplifiers. It connects to the amplifier via a USB cable (included with the amplifier); and with a USB hub, a single computer can connect to multiple (as many as 20) amplifiers at the same time.



Amplifier Navigator offers a complete selection of operations:

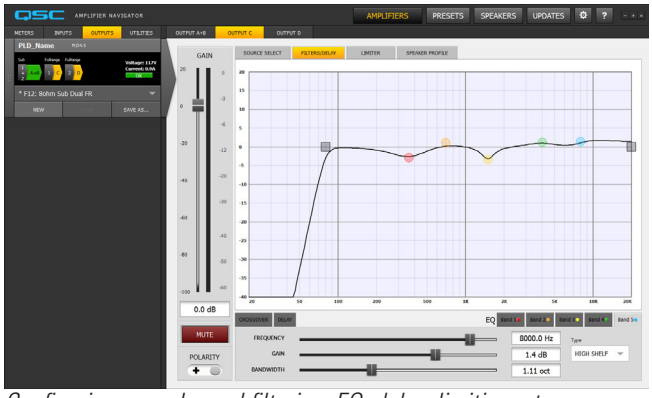
- Amp firmware check and update
- Input configuration
- Output configuration (including preset selection, editing, and saving)
- Selecting and editing loudspeaker profiles
- Copying and transferring configurations among amps
- Logging of AC mains, heat sink temperatures, run time, load impedances, etc.
- Diagnosis



Amp firmware check and updating.

Amplifier Navigator is available for both Mac and the Windows operating system and is downloadable for free from the QSC web site.

Logging of amp parameters.



Configuring amp channel filtering, EQ, delay, limiting, etc.

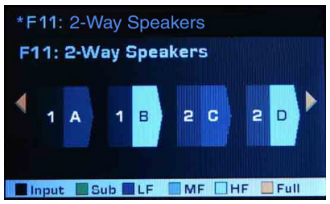
Presets

Twenty factory presets pre-installed in the amp offer all the different combinations of amp channels that FAST allows. Internal relays connect the channel outputs in accordance with how FAST has them arranged. For example, if A and B are parallel, you can use either output connector—A or B—or both of them to connect the loudspeakers.

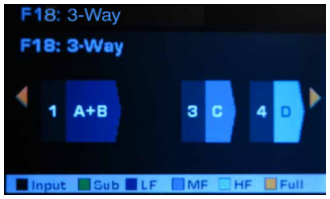
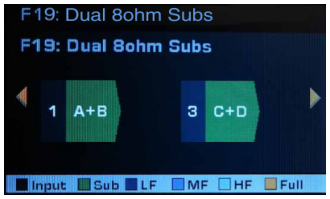
Presets F1 through F9 set up only the amp's output configuration. F10 through F20 provide output configuration along with basic DSP settings for the application described. You can modify or set any parameters and save the configuration in in any of the 50 user preset slots.

The factory presets are identified by the prefix *F* and the user presets by the prefix *U*.

Factory Preset	Display	Description
F1 Four separate output channels		Suitable for as many as four different signals into as many as four different loudspeaker loads. Load impedances may vary from one channel to another, as long as they are 2Ω or higher. Input 1 goes to channel A; Input 2 to channel B; Input 3 to channel C; and Input 4 to channel D.
F2 Channels A and B parallel; C and D separate		Suitable for a high-power 2–4Ω full-range loudspeaker load and two separate full-range loudspeaker loads of any impedance 2Ω or higher. Input 1 goes to the parallel channels A and B; Input 3 to channel C; and Input 4 to channel D.
F3 Channels A and B bridged; C and D separate		Suitable for a high-power 4–8Ω (or higher) full-range loudspeaker load and two separate full-range loudspeaker loads of any impedance 2Ω or higher. Input 1 goes to the bridged channels A and B; Input 3 to channel C; and Input 4 to channel D.
F4 Channels A and B parallel; channels C and D parallel		Suitable for two high-power 2–4Ω full-range loudspeaker loads. Input 1 goes to the parallel channels A and B; Input 3 goes to the parallel channels C and D.
F5 Channels A and B parallel; channels C and D bridged		Suitable for a high-power 2–4Ω full-range loudspeaker load and a high-power 4–8Ω (or higher) full-range loudspeaker load. Input 1 goes to the parallel channels A and B; Input 3 goes to the bridged channels C and D.
F6 Channels A and B bridged; channels C and D bridged		Suitable for two high-power 4–8Ω (or higher) full-range loudspeaker loads. Input 1 goes to the bridged channels A and B; Input 3 goes to the bridged channels C and D.

Factory Preset	Display	Description
F7 Channels A, B, and C parallel; D separate		Suitable for a high-power 2Ω full-range loudspeaker load and a separate full-range loudspeaker load of any impedance 2Ω or higher. Input 1 goes to the parallel channels A, B, and C; Input 4 goes to channel D.
F8 Channels A and B parallel, bridged with channels C and D parallel		Suitable for a high-power 4–8Ω (or higher) full-range loudspeaker load. Use Input 1.
F9 Channels A, B, C, and D parallel.		Suitable for a high-power 1Ω (or higher) full-range loudspeaker load. Use Input 1.
F10 Four separate channels, all full range		This is the same as F1. Input 1 goes to channel A; Input 2 to channel B; Input 3 to channel C; and Input 4 to channel D.
F11 Dual bi-amp mode: Channel A LF plus channel B HF; channel C LF plus channel D HF		This preset uses all four output channels separately, with these input and DSP settings: • Input 1 feeds channels A and B; input 2 feeds channels C and D. • The crossover filter parameters are 1.5 kHz Butterworth, with slopes of 48 dB/octave. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.
F12 Channels A and B bridged for 4–8Ω subwoofer; channels C and D separate full range		This is similar to F3, with these additions: • Channels A and B are bridged, with a 48 dB/octave Butterworth low-pass filter at 80 Hz. The signal is summed from inputs 1 and 2. • Channels C and D are separate, suitable for stereo mains, with 48 dB/octave Butterworth high-pass filters at 80 Hz, which perfectly complements the subwoofer filtering in A and B. Channel C's signal is from input 1 and D's is from input 2. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.

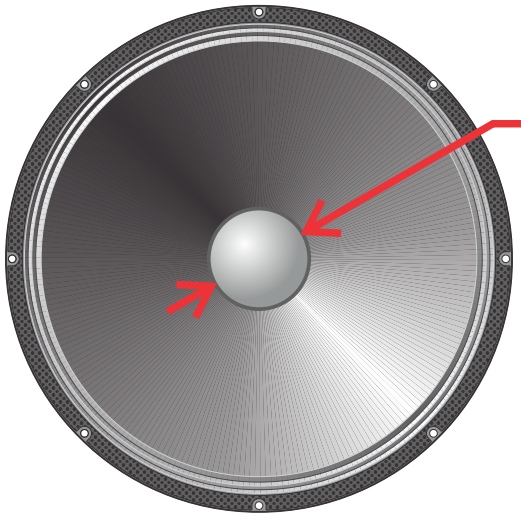
Factory Preset	Display	Description
F13 Channels A and B parallel for 4Ω sub-woofer; channels C and D separate full range		This is similar to F2, with these additions: • Channels A and B are parallel, with a 48 dB/octave Butterworth low-pass filter at 80 Hz. The signal is summed from inputs 1 and 2. • Channels C and D are separate, suitable for stereo mains, with 48 dB/octave Butterworth high-pass filters at 80 Hz, which perfectly complements the subwoofer filtering in A and B. Channel C's signal is from input 1 and D's is from input 2. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.
F14 Channels A and B bridged, full range; channels C and D bridged, full range		This is similar to F6, with these additions: • Input 1 goes to the bridged channels A and B; Input 2 goes to the bridged channels C and D. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.
F15 Single bi-amp mode: Channels A and B bridged for 4–8Ω LF; channels C and D bridged for 4–8Ω HF		This is similar to F6, with these additions: • Input 1 goes to the bridged channels A and B, with a 48 dB/octave Butterworth low-pass filter at 1.5 kHz. • Input 2 goes to the bridged channels C and D, with a 48 dB/octave Butterworth high-pass filter at 1.5 kHz. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.
F16 Single bi-amp mode: Channels A and B parallel for 2–4Ω LF; channels C and D parallel for 2–4Ω HF		This is similar to F4, with these additions: • Channels A and B are parallel, with a 48 dB/octave Butterworth low-pass filter at 1.5 kHz. The signal source is Input 1. • Channels C and D are parallel, with a 48 dB/octave Butterworth high-pass filter at 1.5 kHz. The signal source is Input 2. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.

Factory Preset	Display	Description
F17 Channels A and B bridged for 8Ω subwoofer; channels C and D bridged for 8Ω full range		This is a mono preset geared toward "subs on aux" arrangements. • Channels A and B are bridged for use with an 8Ω subwoofer system; their signal comes from Input 1 and has a 48 dB/octave Butterworth low-pass filter at 80 Hz. • Channels C and D are bridged for use with a high-power 8Ω full-range loudspeaker system; their signal comes from Input 2 and goes through a 48 dB/octave Butterworth low-pass filter at 80 Hz. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.
F18 Single three-way mode: Channels A and B bridged LF; channel C MF; channel D HF		This is similar to F3, with these additions: • Channels A and B are bridged, with a 48 dB/octave Butterworth low-pass filter at 400 Hz. • Channel C is bandpassed from 400 Hz (48 dB/octave Butterworth high-pass) to 1.5 kHz (24 dB/octave Butterworth low-pass). • Channel D has a high-pass filter at 1.5 kHz (48 dB/octave Butterworth). • All the channels get their signal from Input 1. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.
F19 Channels A and B bridged for 4–8Ω subwoofer; channels C and D bridged for 8Ω subwoofer		This is similar to F6, with these additions: • Channels A and B are bridged, with a 48 dB/octave Butterworth low-pass filter at 80 Hz. • Channels C and D are bridged, with a 48 dB/octave Butterworth low-pass filter at 80 Hz. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.
F20 Channels A and B parallel for 2–4Ω subwoofer; channels C and D parallel for 2–4Ω subwoofer		This is similar to F4, with these additions: • Channels A and B are parallel, with a 48 dB/octave Butterworth low-pass filter at 80 Hz. • Channels C and D are parallel, with a 48 dB/octave Butterworth low-pass filter at 80 Hz. These parameters are only a starting point; you can alter any of them and save the configuration into a user preset.

2. Real-World Applications with PLD

Loudspeaker power capacities

Loudspeaker manufacturers publish power ratings for their systems, but you can also estimate the appropriate amp power by measuring the woofer's voice coil diameter. Loudspeaker drivers with larger voice coils can generally handle higher power than those with smaller ones. The dust cap in the center of the cone may or may not be the same diameter as the voice coil; consult the manufacturer's spec sheet to be sure.



Voice coil diameter
1.5 to 2.5 in. (3.8 to 6.3 cm)
100–200 watts thermal power capacity

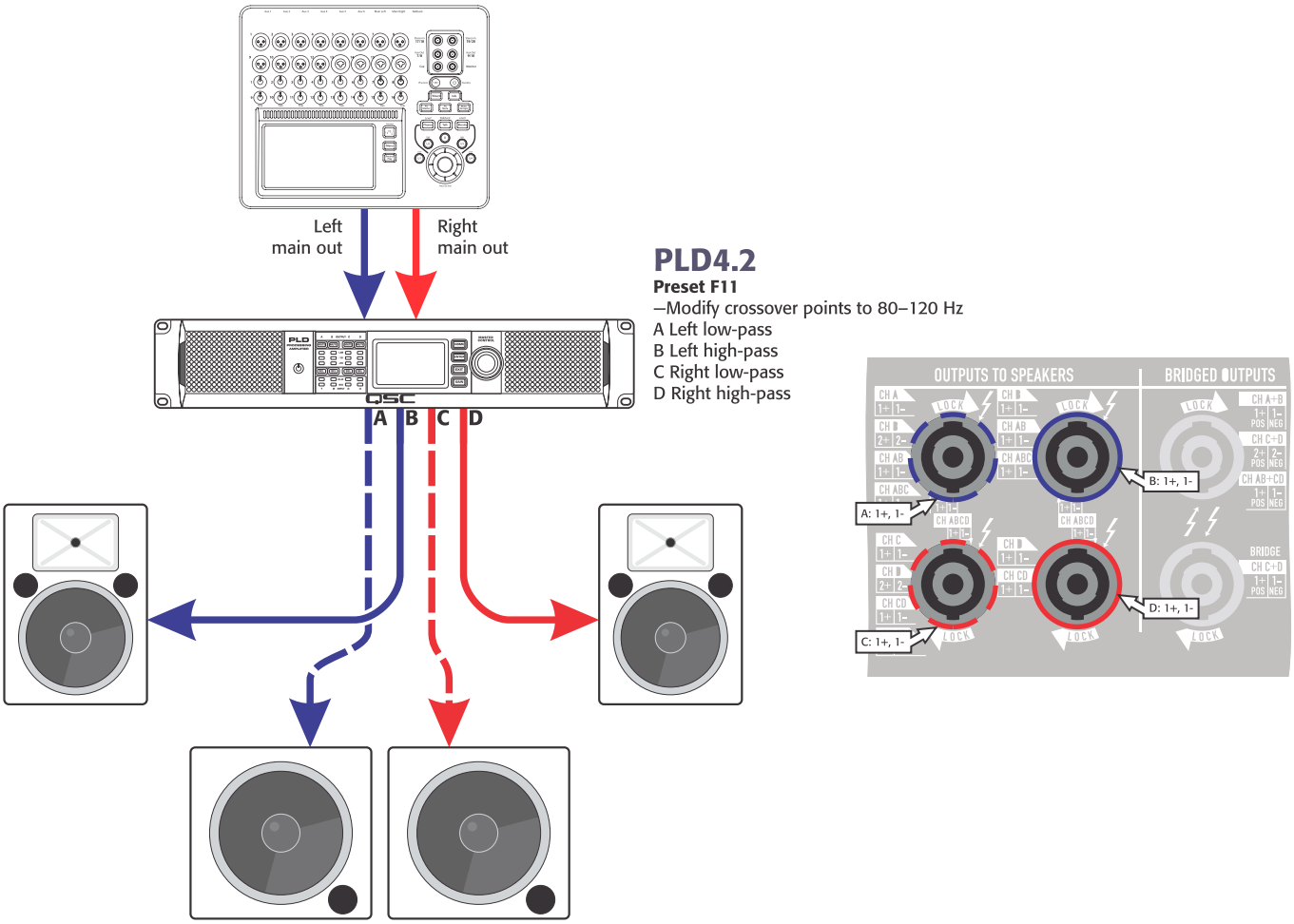
3 to 4 in. (7.5 to 10 cm)
200–400 watts thermal power capacity

	# of woofers	Impedance	Recommended Amp Power	Configuration
Medium power	1	8Ω	200 to 400 watts	PLD4.2 single channel
	2	4Ω	400 to 800 watts	PLD4.3 single channel
High power	1	8Ω	400 to 800 watts	PLD4.3 single channel
	2	4Ω	800 to 1600 watts	PLD4.5 single channel

Application: Stereo passive tops and subs

- **Two 8Ω medium-power single-woofer passive tops, stereo**
- **Two 8Ω medium-power single subwoofers, stereo**

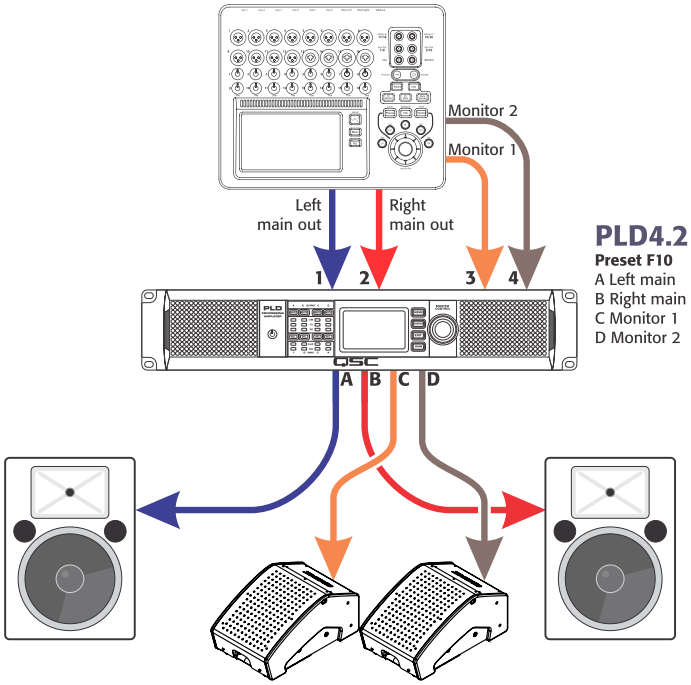
	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two medium-power two-channel amps	~8 A / ~4 A	4	1200	~80 lb
New paradigm	PLD4.2	4.6 A / 2.3 A	2	2000	18.5 lb

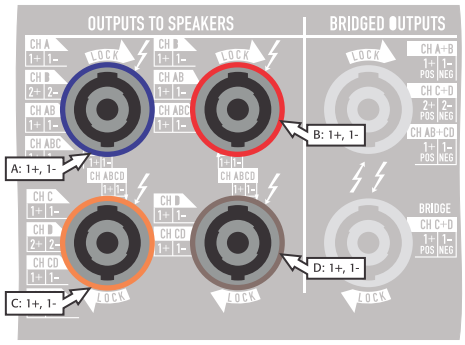


Application: Stereo passive mains with two monitor mixes

- **Two 8Ω medium-power single-woofer passive full-range, stereo**
- **Two 8Ω medium-power passive monitors, two mixes**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two medium-power two-channel amps	~8 A / ~4 A	4	1200	~80 lb
New paradigm	PLD4.2	4.6 A / 2.3A	2	2000	18.5 lb

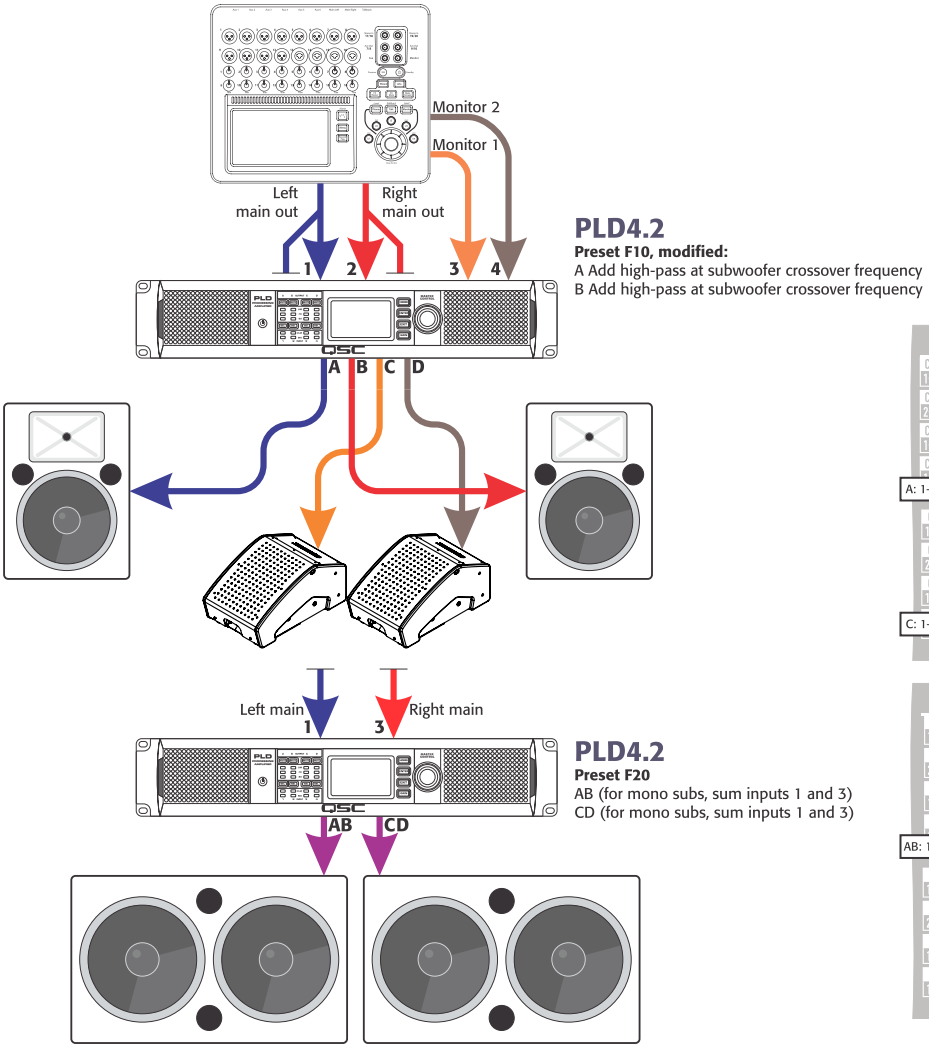


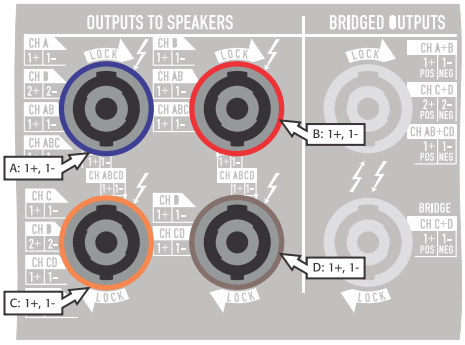


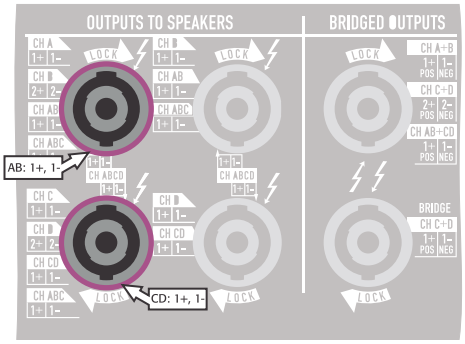
Application: Stereo passive tops and subs with two monitor mixes

- **Two 8Ω medium-power single-woofer passive tops, stereo**
- **Two 8Ω medium-power single subwoofers, mono**
- **Two 8Ω medium-power passive monitors, two mixes**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two medium-power two-channel amps	~11 A / ~5.5 A	4	1650	~80 lb
New paradigm	Two PLD4.2	9.4 A / 4.7 A	4	5000	37 lb



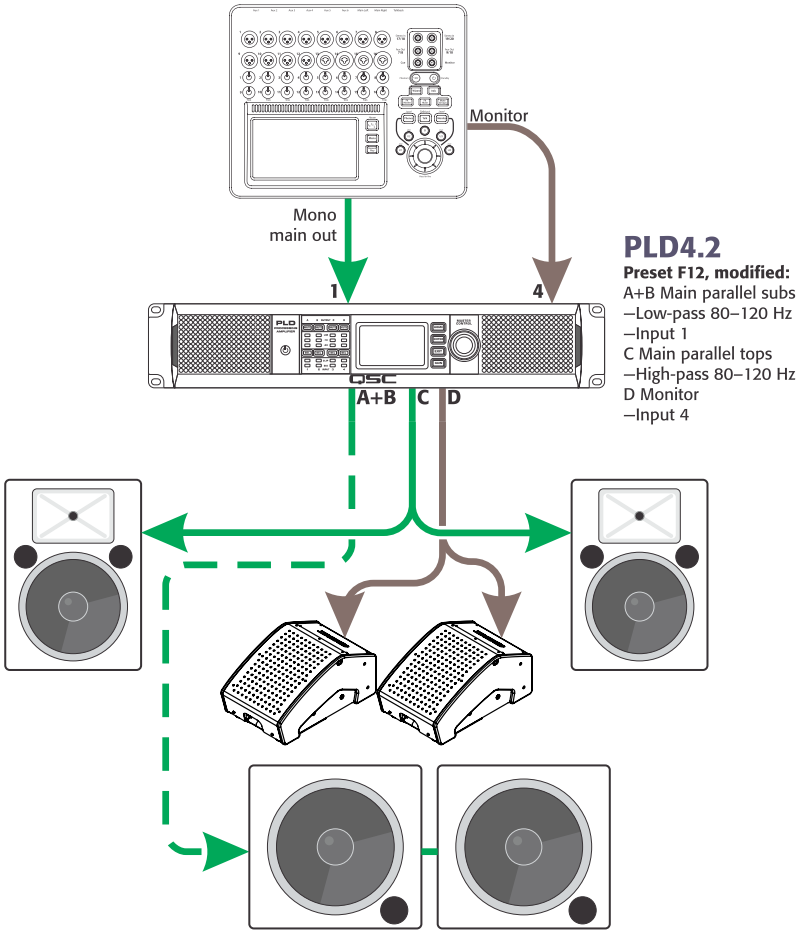


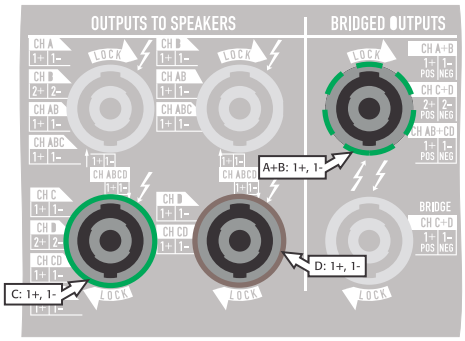


Application: Mono passive tops and subs with two monitors on one mix

- **Two 8Ω medium-power single-woofer passive tops, mono**
- **Two 4Ω medium-power double subwoofers, mono**
- **Two 8Ω medium-power passive monitors, one mix**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two low-power two-channel amps + high-power two-channel amp	~11 A / ~5.5 A	7	2800	~140 lb
New paradigm	PLD4.2	4.7 A / 2.3 A	2	2600	18.5 lb

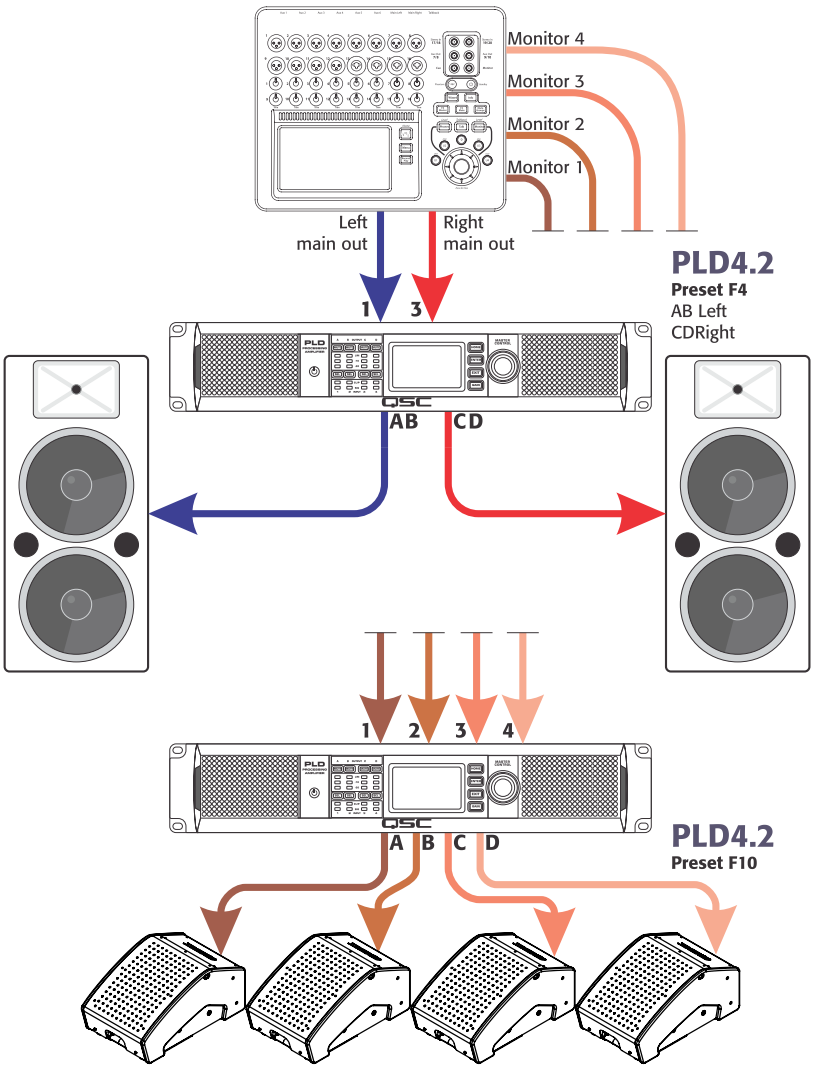


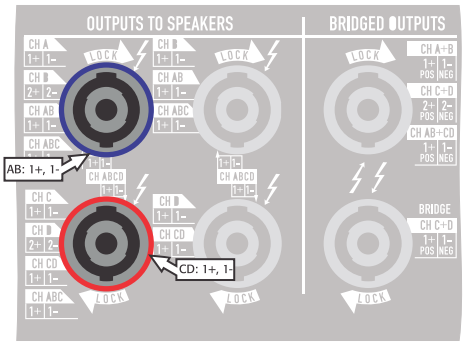


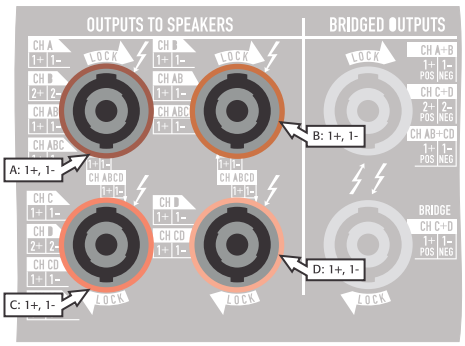
Application: Stereo full-range mains with four monitor mixes

- **Two 4Ω medium-power double-woofer passive full-range mains, stereo**
- **Four 8Ω medium-power passive monitors, four mixes**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two low-power two-channel amps + high-power two-channel amp	~12.5 A / ~6.2 A	7	3100	~140 lb
New paradigm	Two PLD4.2	9.3 A / 4.6 A	4	5000	37 lb



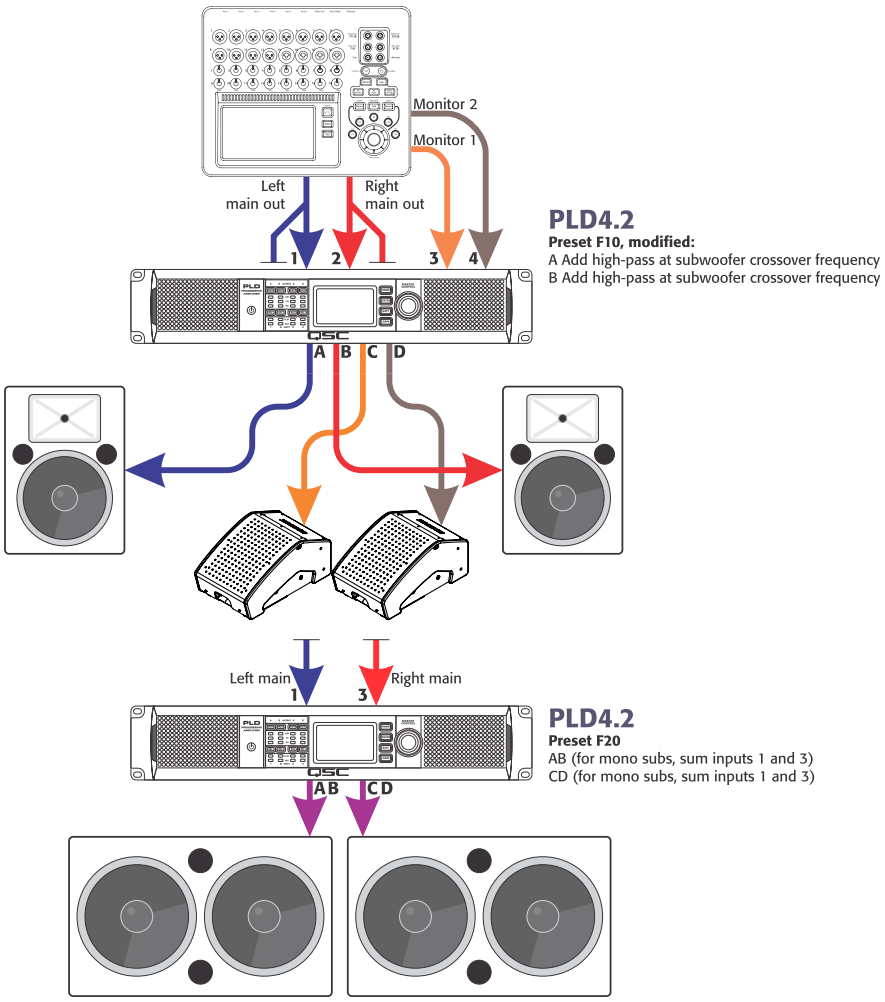


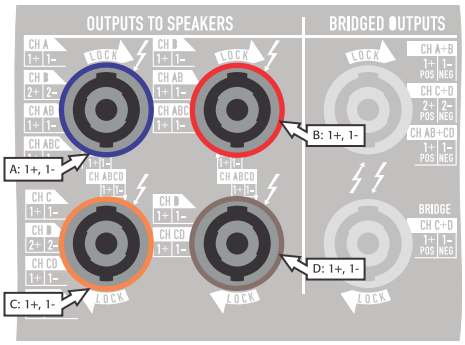


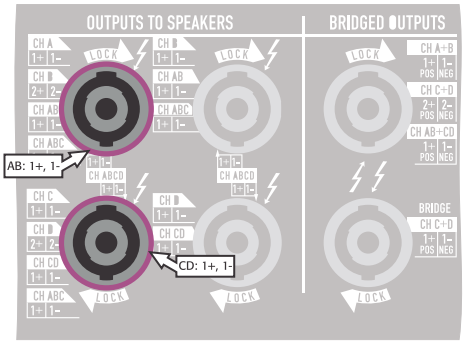
Application: Stereo passive tops and subs with two monitor mixes

- **Two 4Ω medium-power double-woofer passive tops, stereo**
- **Two 4Ω high-power double subwoofers, stereo**
- **Two 8Ω medium-power passive monitors, two mixes**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two low-power two-channel amps + high-power two-channel amp	~12.5 A / ~6.2 A	7	3100	~140 lb
New paradigm	Two PLD4.2	9.3 A / 4.6 A	4	5000	37 lb



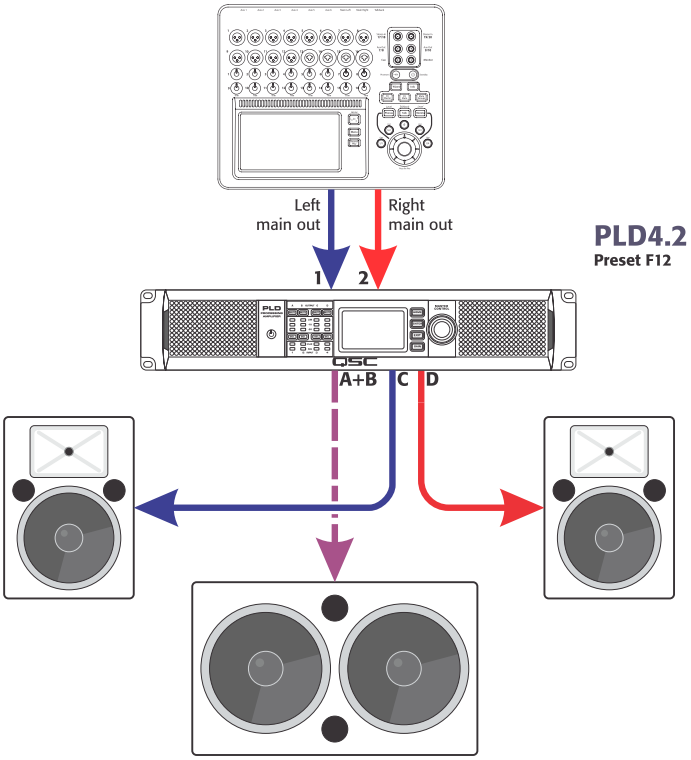


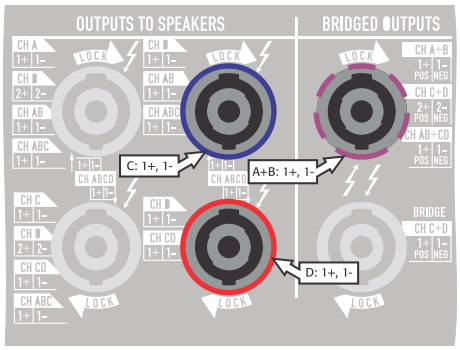


Application: Stereo passive tops and mono sub

- **Two 8Ω medium-power single-woofer passive tops, stereo**
- **One 4Ω high-power double subwoofer**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Medium-power two-channel amp High-power two-channel amp (bridged)	~19 A / ~9.5 A	5	4200	~110 lb
New paradigm	PLD4.2	4.7 A / 2.3 A	2	2200	18.5 lb

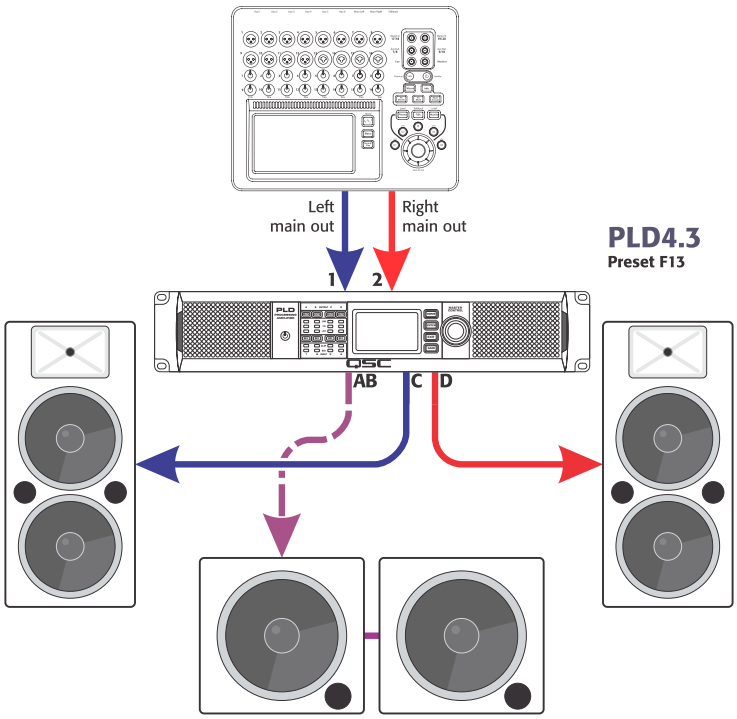


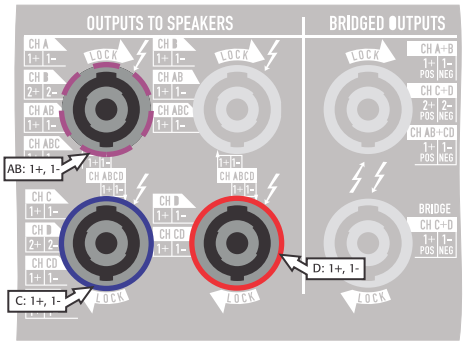


Application: Stereo passive tops and two mono subs

- **Two 4Ω medium-power double-woofer passive tops, stereo**
- **Two 8Ω high-power single subwoofers, mono**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Medium-power two-channel amp High-power two-channel amp (bridged)	~21 A / ~10.5 A	5	4650	~110 lb
New paradigm	PLD4.3	5 A / 2.5 A	2	4800	21 lb

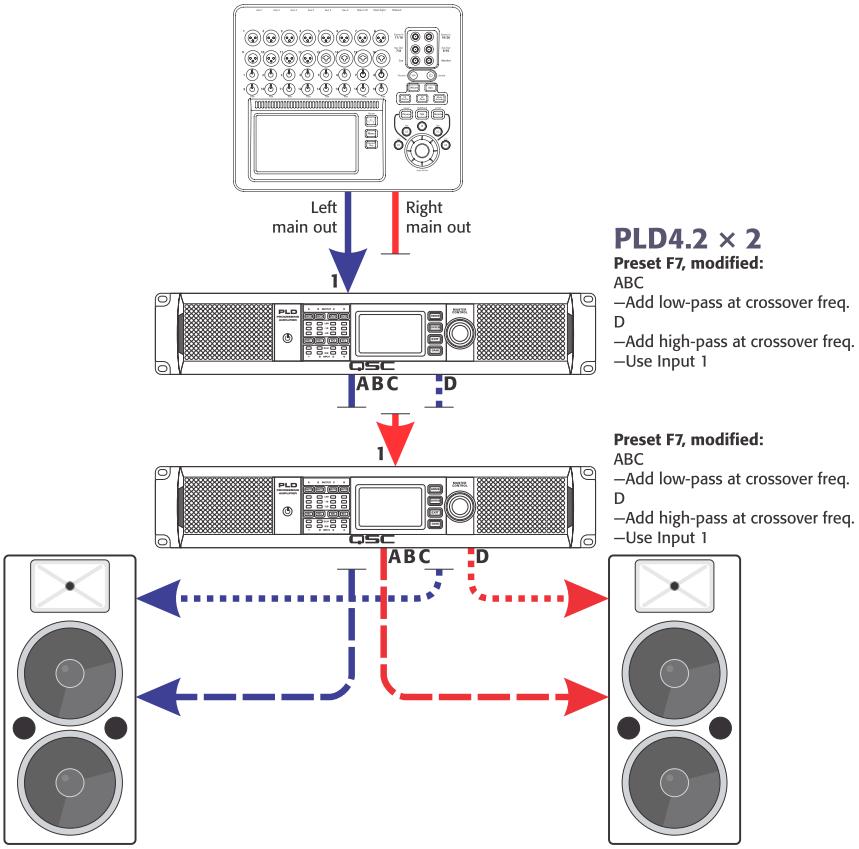


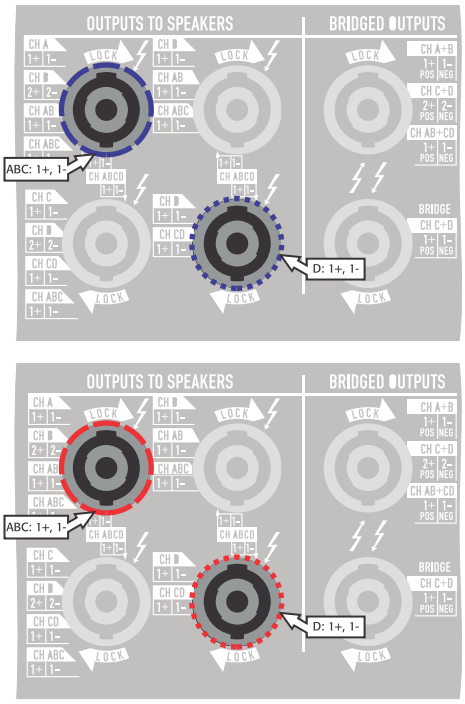


Application: Stereo bi-amp mains

- **Two 4Ω + 8Ω high-power double-woofer bi-amp mains, stereo**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Low-power two-channel amp High-power two-channel amp	~13 A / ~6.5 A	5	2750	~100 lb
New paradigm	Two PLD4.2	4.7 A / 2.3 A	4	5200	37 lb

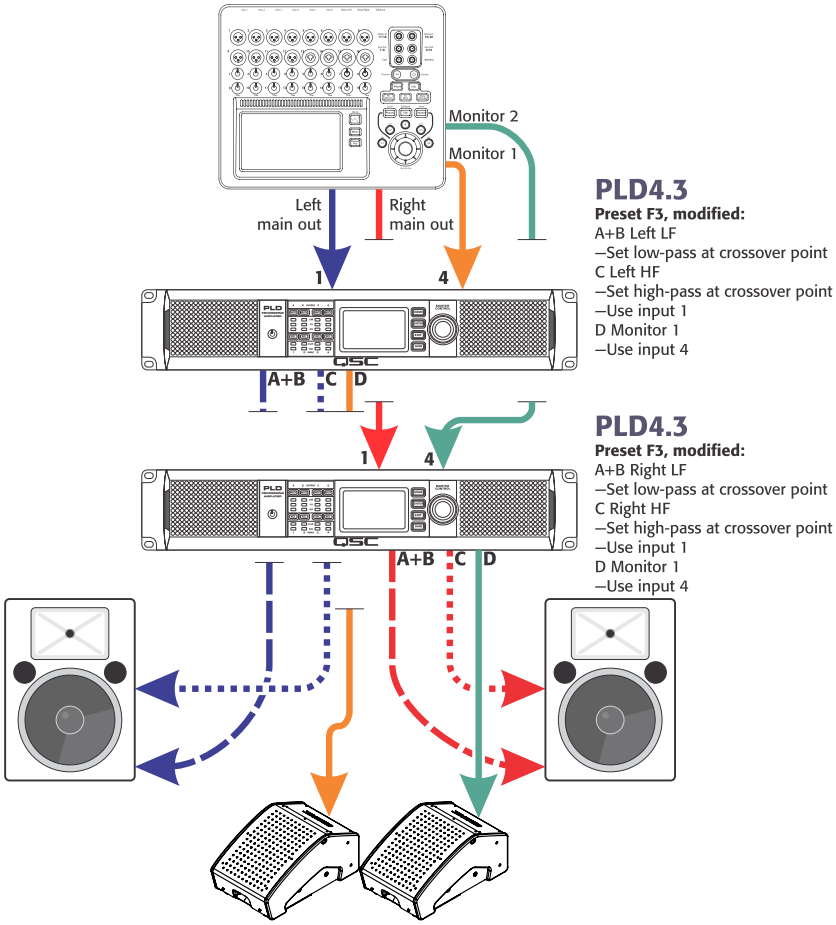


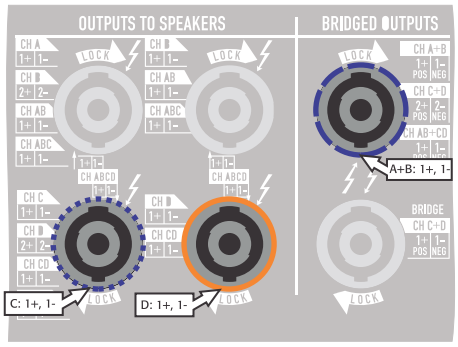


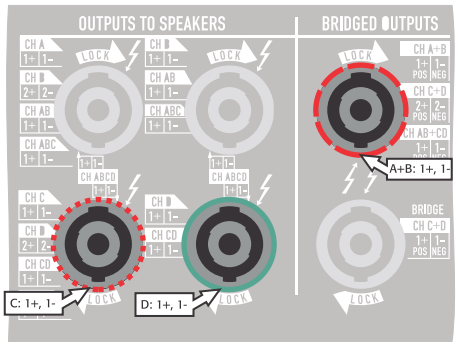
Application: Stereo bi-amp mains with two monitor mixes

- **Two 8Ω high-power single-woofer bi-amp mains, stereo**
- **Two 8Ω high-power passive monitors, two mixes**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two low-power two-channel amps High-power two-channel amp	~13 A / ~6.5 A	7	2100	~135 lb
New paradigm	Two PLD4.3	4.6 A / 2.3 A	4	9400	42 lb



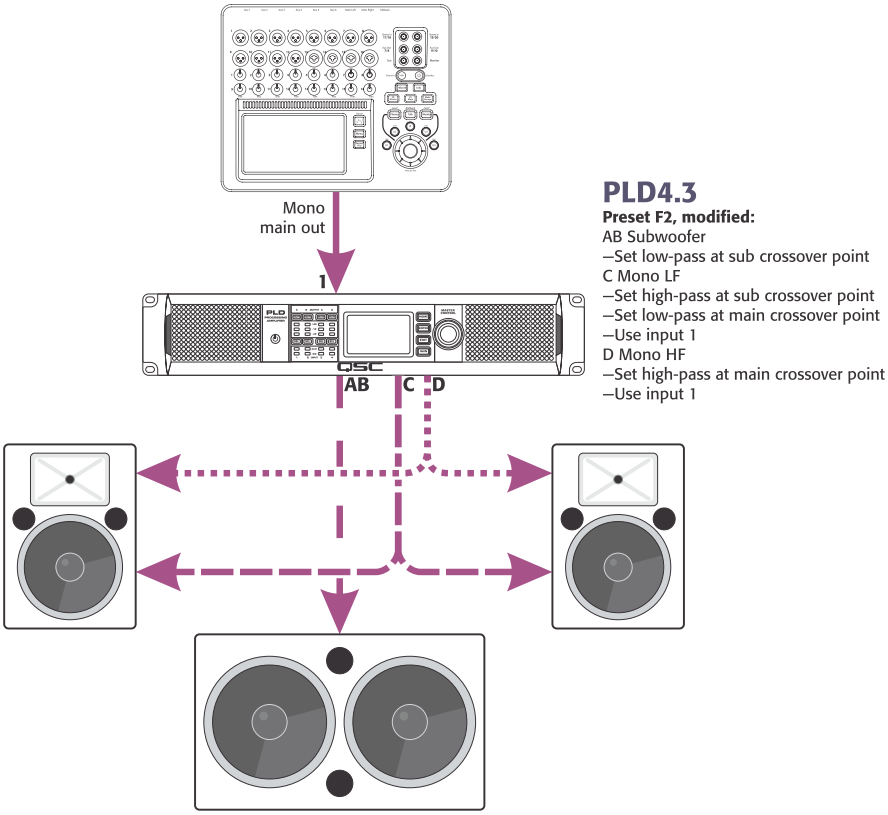




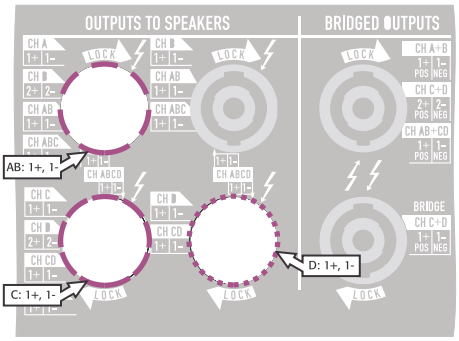
Application: Mono bi-amp tops and sub

- **Two 8Ω high-power single-woofer bi-amp tops, mono**
- **One 4Ω high-power double-woofer subwoofer**

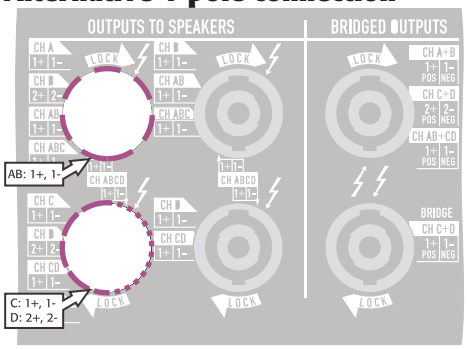
	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Low-power two-channel amp High-power two-channel amp	~13 A / ~6.5 A	5	2750	~100 lb
New paradigm	PLD4.3	4.7 A / 2.3 A	2	5600	21 lb



PLD4.3
Preset F2, modified:
AB Subwoofer
–Set low-pass at sub crossover point
C Mono LF
–Set high-pass at sub crossover point
–Set low-pass at main crossover point
–Use input 1
D Mono HF
–Set high-pass at main crossover point
–Use input 1



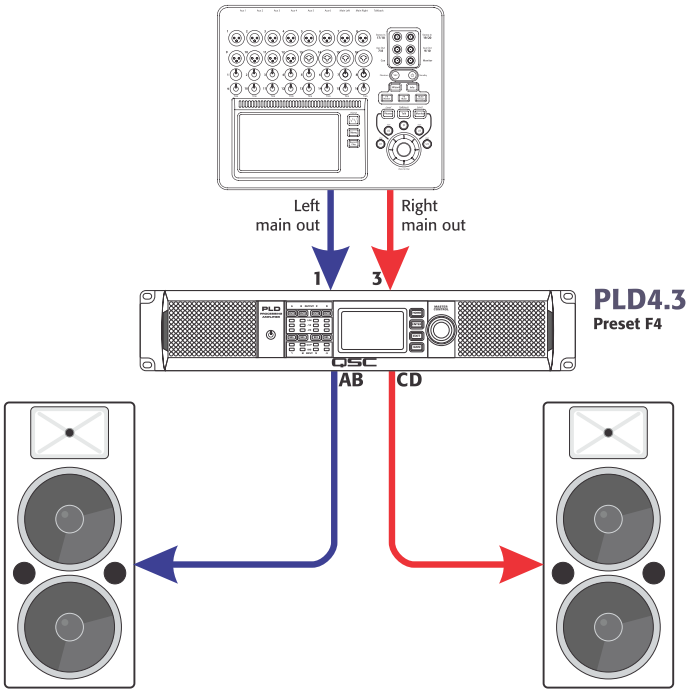
Alternative 4-pole connection

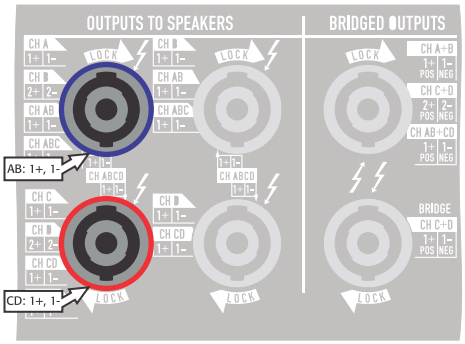


Application: Stereo full-range mains

- **Two 4Ω medium-power double-woofer passive main loudspeakers, stereo**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	High-power two-channel amp	~10 A / ~5 A	3	2400	~65 lb
New paradigm	PLD4.3	4.4 A / 2.2 A	2	3600	21 lb

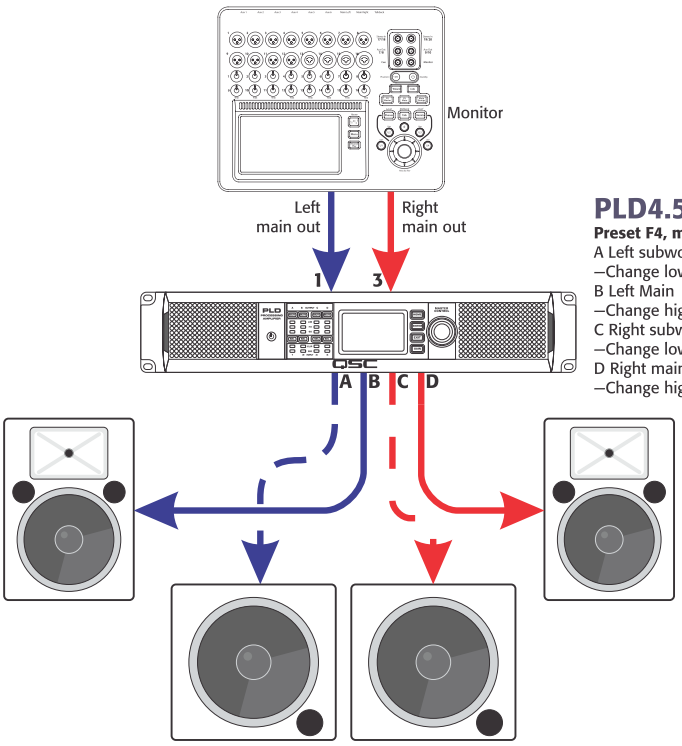




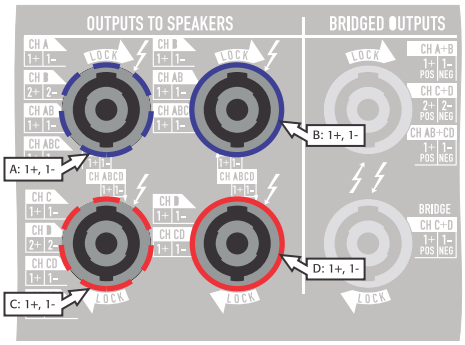
Application: Stereo passive tops and subs

- **Two 8Ω high-power single-woofer passive tops, stereo**
- **Two 8Ω high-power single subwoofers, stereo**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two high-power two-channel amps	~13 A / ~6.5 A	6	2800	~130 lb
New paradigm	PLD4.5	6.8 A / 3.4 A	2	4800	22 lb



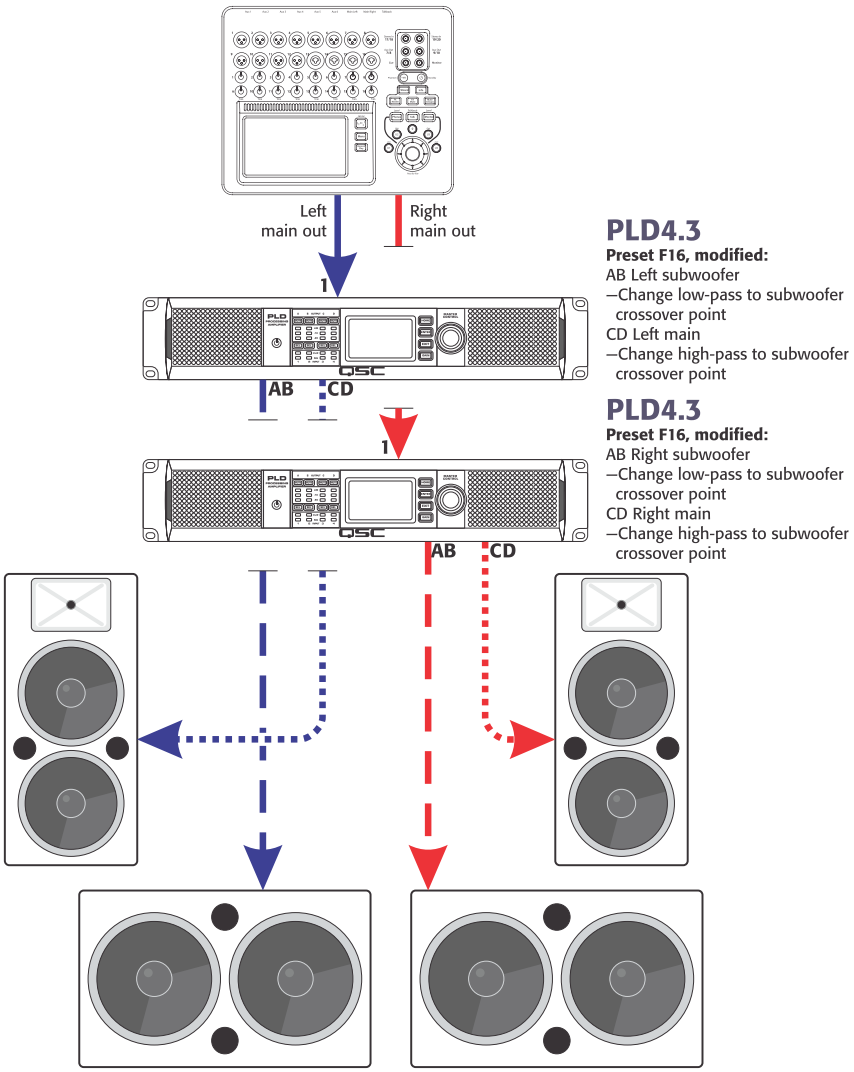
PLD4.5
Preset F4, modified:
A Left subwoofer
—Change low-pass to subwoofer crossover point
B Left Main
—Change high-pass to subwoofer crossover point
C Right subwoofer
—Change low-pass to subwoofer crossover point
D Right main
—Change high-pass to subwoofer crossover point

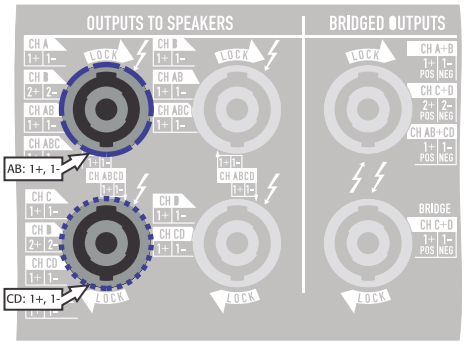


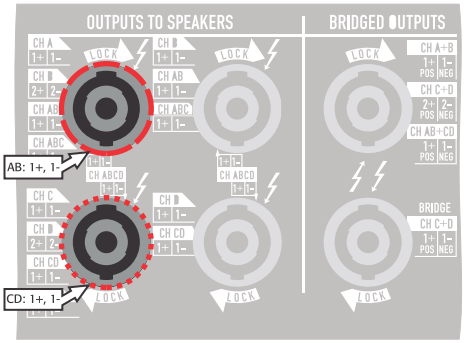
Application: Stereo passive tops and subs

- **Two 4Ω high-power double-woofer passive tops, stereo**
- **Two 4Ω high-power double subwoofers, stereo**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two high-power two-channel amps	~13 A / ~6.5 A	6	2800	~130 lb
New paradigm	Two PLD4.3	10.6 A / 5.3 A	4	8000	42 lb



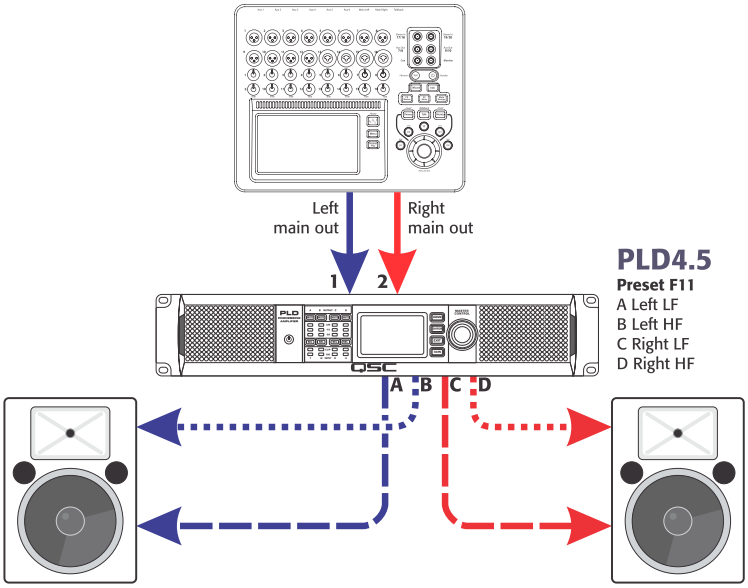


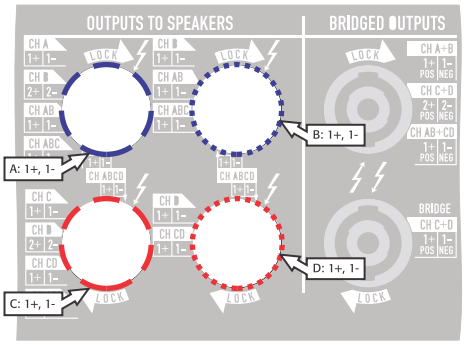


Application: Stereo bi-amp mains

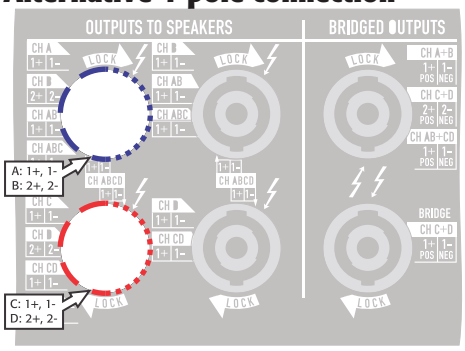
- **Two 8Ω high-power single-woofer bi-amp loudspeakers, stereo**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two high-power two-channel amps	~13 A / ~6.5 A	6	2800	~130 lb
New paradigm	PLD4.5	6.8 A / 3.4 A	2	4800	22 lb





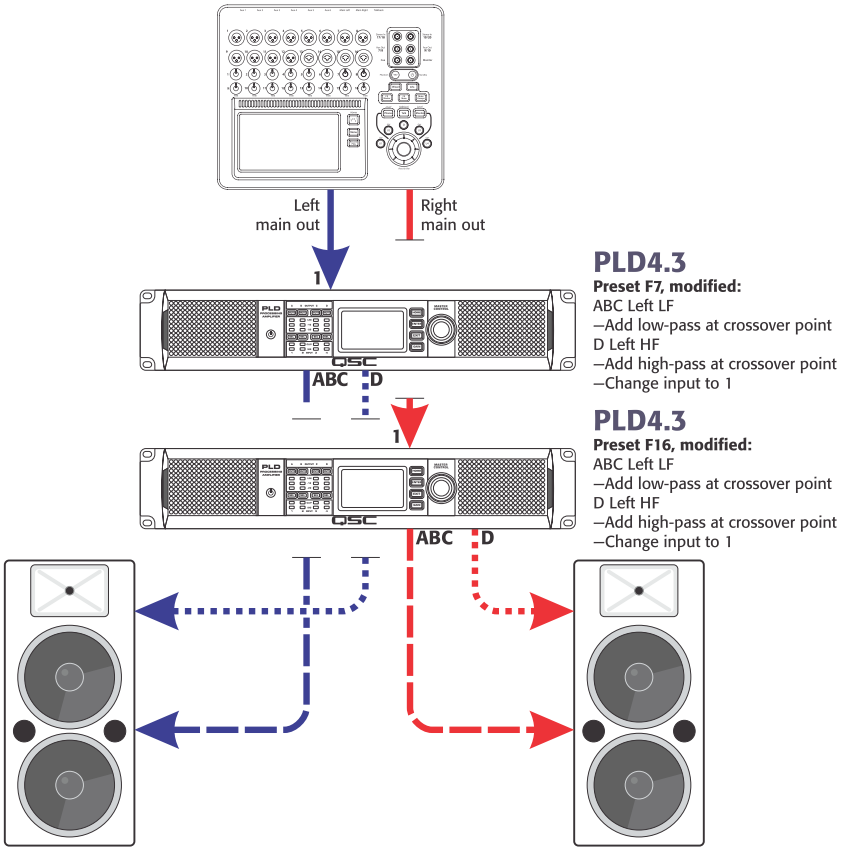
Alternative 4-pole connection

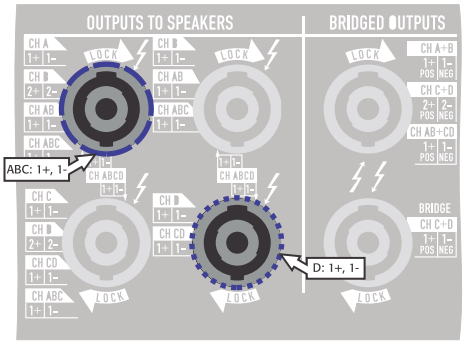


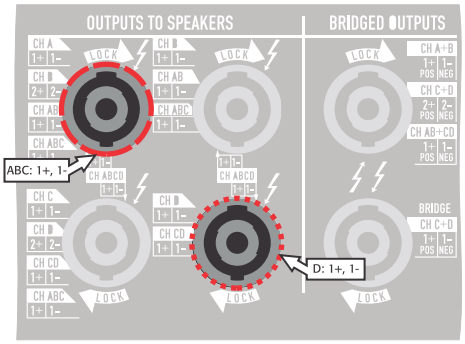
Application: Stereo bi-amp mains

- **Two 4Ω high-power double-woofer bi-amp loudspeakers, stereo**

	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Two high-power two-channel amps	~13 A / ~6.5 A	6	2800	~130 lb
New paradigm	Two PLD4.3	4.8 A / 2.4 A	2	3100	42 lb



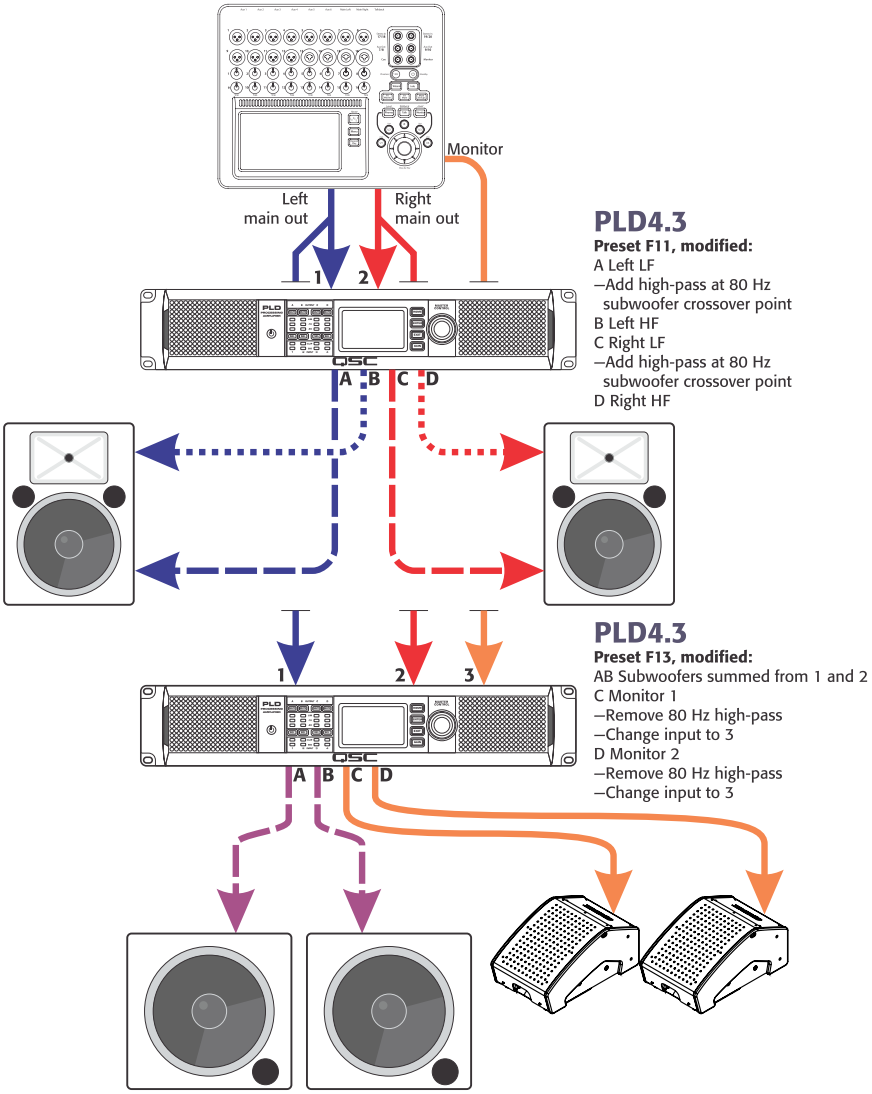


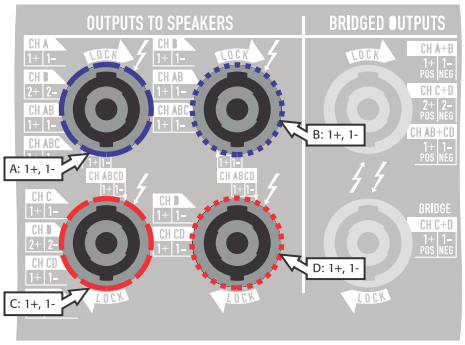


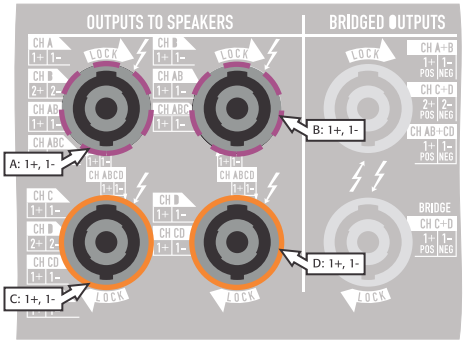
Application: Stereo bi-amp tops and mono subs, with two monitors on one mix

- **Two 8Ω high-power single-woofer bi-amp loudspeakers, stereo**
- **Two 8Ω high-power single subwoofers, mono**
- **Two 8Ω high-power passive monitors, one mix**

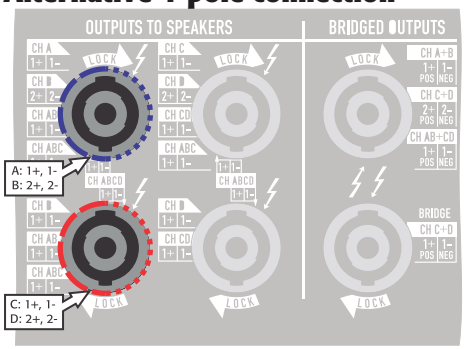
	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Low-power two-channel amp Two high-power two-channel amps	~19.5 A / ~9.7 A	8	4150	~165 lb
New paradigm	Two PLD4.3	4.4 A / 2.2 A	2	7400	42 lb







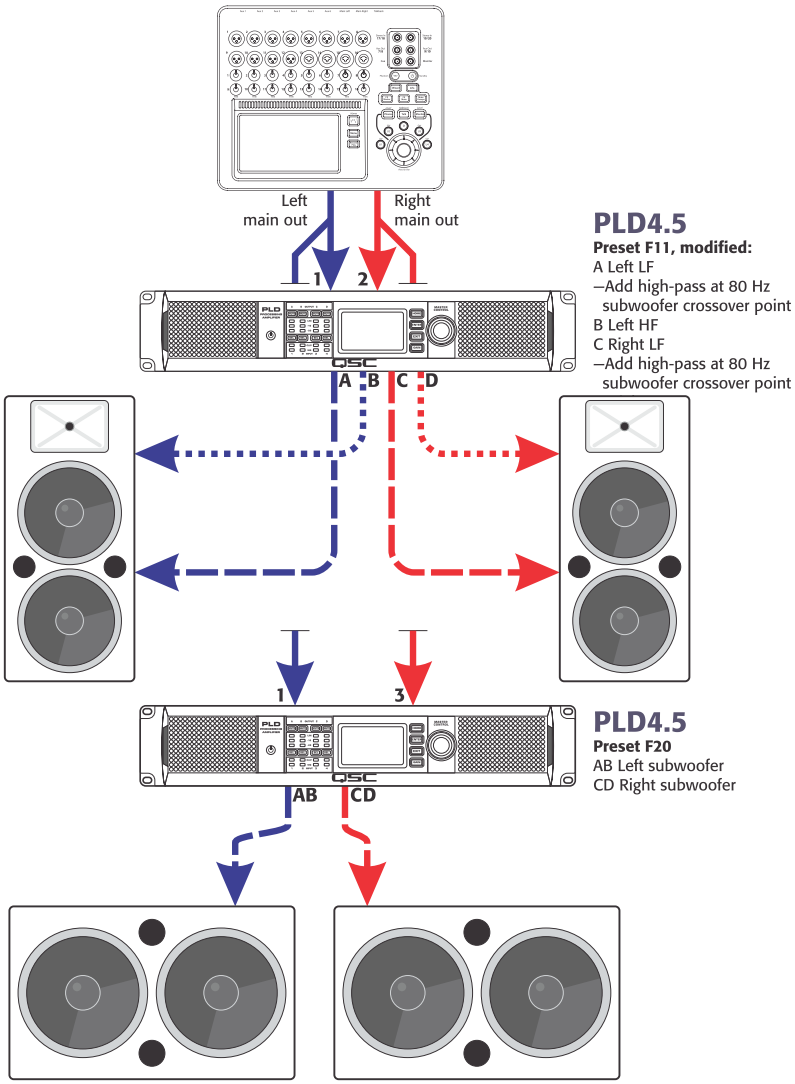
Alternative 4-pole connection

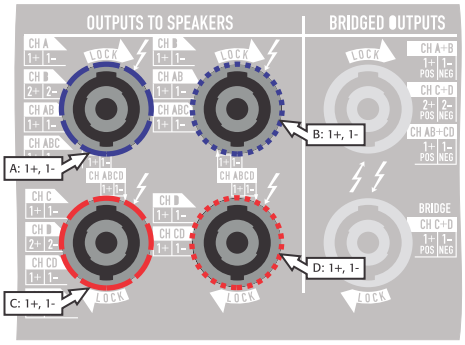


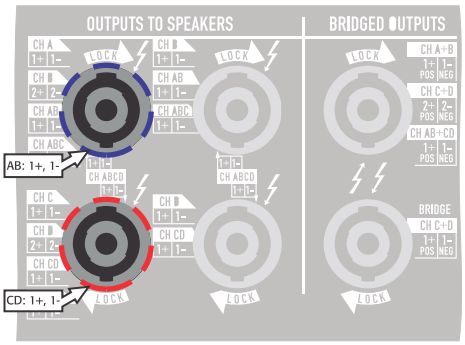
Application: Stereo bi-amp tops and subs

- **Two 4Ω high-power double-woofer bi-amp loudspeakers, stereo**
- **Two 4Ω high-power double subwoofers, stereo**

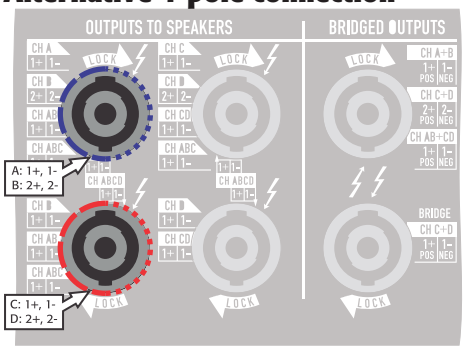
	Equipment	Current draw 120 V / 230 V	Rack spaces	Total watts	Weight
Old paradigm	Low-power two-channel amp Two high-power two-channel amps	~23 A / ~11.5 A	8	5150	~165 lb
New paradigm	Two PLD4.5	13.6 A / 6.8 A	2	11200	44 lb







Alternative 4-pole connection



3. PLD Series Specifications

	PLD4.2		PLD4.3		PLD4.5	
	Burst	**Continuous**	**Burst**	**Continuous**	**Burst**	**Continuous**
4 Channels[1]						
8Ω	500 watts	400 watts	900 watts	625 watts	1200 watts	1150 watts
4Ω	700 watts	400 watts	1400 watts	625 watts	2000 watts	1250 watts
2Ω	600 watts	350 watts	1200 watts	625 watts	1600 watts	625 watts
2 Channels[1] (AB and CD)						
8Ω	1200 watts	800 watts	2400 watts	1250 watts	4000 watts	2250 watts
4Ω	1500 watts	800 watts	2000 watts	1250 watts	2400 watts	2250 watts
2Ω	1500 watts	650 watts	2500 watts	1250 watts	4000 watts	2100 watts
1 Channel[1] (ABCD)						
8Ω	1600 watts	1500 watts	3500 watts	2500 watts	4500 watts	4200 watts
4Ω	2500 watts	1600 watts	5000 watts	2500 watts	7500 watts	4200 watts
2Ω	1700 watts	1600 watts	3500 watts	2500 watts	4500 watts	4250 watts
1Ω	2500 watts	1600 watts	5000 watts	2500 watts	7500 watts	3700 watts
Bridged Mono (A+B or C+D)						
8Ω	1400 watts	800 watts	2800 watts	1250 watts	4000 watts	2500 watts
4Ω	1200 watts	700 watts	2400 watts	1250 watts	3200 watts	1250 watts
Bridged Mono (AB+CD)						
8Ω	2400 watts	1400 watts	4800 watts	2500 watts	6400 watts	2500 watts
4Ω	2800 watts	1600 watts	5600 watts	2500 watts	8000 watts	2500 watts
Typical Distortion						
8Ω	0.01–0.03%		0.01–0.03%		0.01–0.03%	
4Ω	0.03–0.06%		0.03–0.06%		0.03–0.06%	
Maximum Distortion 4Ω–8Ω	1.0%		1.0%		1.0%	
Frequency Response (8Ω load)	20 Hz–15 kHz, ±0.2 dB		20 Hz–15 kHz, ±0.2 dB		20 Hz–15 kHz, ±0.2 dB	
Noise						
(unweighted, output unmuted)	-101 dB		-101 dB		-101 dB	
(A weighted, output muted)	-109 dB		-109 dB		-109 dB	
Maximum Gain (+4 dBu sensitivity)	34 dB		38.4 dB		38.4 dB	
Damping Factor (8Ω load)	>150		>150		>150	
Input Impedance	>10 kΩ, balanced or unbalanced		>10 kΩ, balanced or unbalanced		>10 kΩ, balanced or unbalanced	
Maximum RMS Input Level						
3.9 V (+14 dBu) setting	12.28 V (+24 dBu)		12.28 V (+24 dBu)		12.28 V (+24 dBu)	
1.2 V (+4 dBu) setting	3.88 V (+14 dBu)		3.88 V (+14 dBu)		3.88 V (+14 dBu)	
Controls and Indicators (front)	Power; Channel MUTE buttons; Channel SELECT buttons; Channel input signal and clip LED indicators; Channel output meters and limit LED indicators; HOME, ENTER, EXIT, and GAIN navigation buttons; MASTER CONTROL knob					
Controls and Indicators (rear)	AC power disconnect					
Input Connectors	Four female XLR; four male XLR loop-through					
Output Connectors	Six NL4 Speakon					
Amplifier and Load Protection	Short circuit; Open circuit; Thermal; RF protection; DC fault; Active inrush limiting; Input current limiting					
AC Power Input	Universal power supply, 100–240 VAC, 50–60 Hz					
Dimensions (HWD)	3.5″ × 19″ ×12″ 89 mm × 482 mm × 305 mm		3.5″ × 19″ ×16″ 89 mm × 482 mm × 406 mm		3.5″ × 19″ ×16″ 89 mm × 482 mm × 406 mm	
Weight–Net/Shipping	18.5 lb (8.4 kg) / 22 lb (10 kg)		21 lb (9.5 kg) / 25 lb (11.3 kg)		22 lb (10 kg) / 26 lb (11.8 kg)	
Agency Approvals	UL, CE, RoHS/WEEE compliant, FCC Class A (conducted and radiated emissions)					
Carton Contents	Locking IEC cable, Quick Start Guide, USB cable					

[1] 1 kHz sine wave at 1% THD, all channels driven

QSC Audio Products, LLC
Application Engineering Team
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